

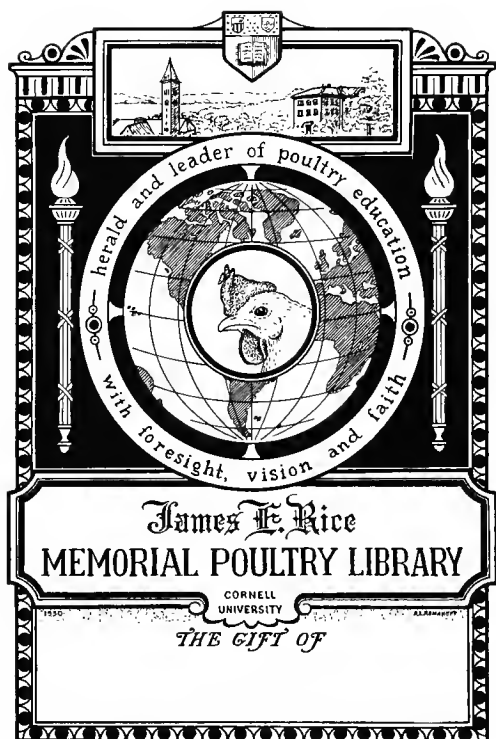
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EVERYBODY'S

STANDARD POULTRY • • GUIDE • •

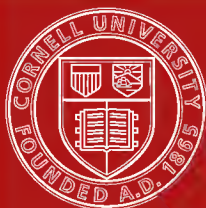


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**EVERYBODYS
STANDARD POULTRY GUIDE**

POULTRY

AMERICA'S

BILLION DOLLAR
INDUSTRY

EVERYBODYS STANDARD POULTRY GUIDE

HENRY P. SCHWAB
EDITOR

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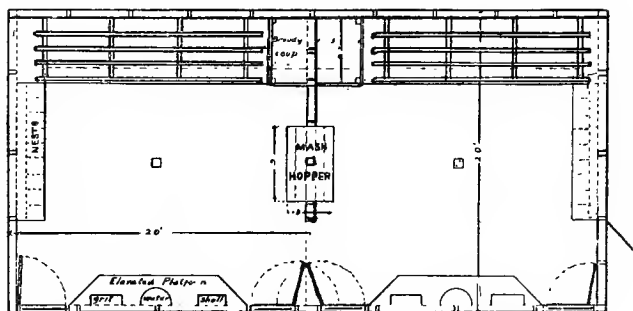
PREFACE

In "Everybody's Standard Poultry Guide" we present to the public a selected collection of standard and original articles that deal with every phase of successful poultry production that were written for this volume by America's most able and successful breeders, judges, authors and professors in poultry culture who have well combined theory with actual practice and who here offer the results of their practice, success and advice to the poultry public.

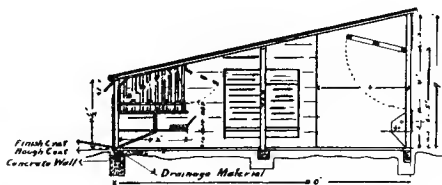
To furnish practical and reliable poultry information on the profitable management and care of poultry is the object of this book. The text is original and the scope unlimited, which if followed will have a far-reaching and beneficial effect and assure the greater production of standard-bred poultry in America.

With the hope that both the old and new breeders, and particularly the beginners, will herein find knowledge of value and improved methods in poultry production that will aid in their personal success, we commend this volume to the public.

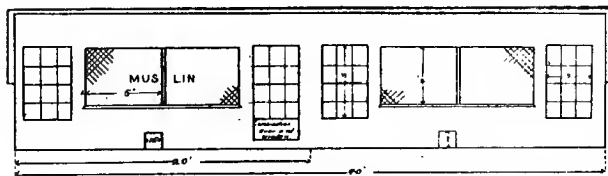
H. P. SCHWAB, Editor.



CROSS-SECTION



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CHAPTER I.

POSSIBILITIES OF THE POULTRY BUSINESS.

By H. P. SCHWAB.

For those that are now interested in poultry, as well as for those that possibly may, or should be, there exists a real live illustrated condition of facts today, that is worthy of careful and special attention. From facts procured in every possible way, and from a careful study of conditions, it must be evident that the demand for both poultry and eggs is far from being supplied. The prices that now prevail for these necessities are the best excuse we have to offer for this article on the possibilities of the poultry business. Were the supply doubled at this time, it is safe to say it would not affect the prevailing prices, as the demand is even now in excess to such a condition. The demand for quality poultry meat and eggs is just about doubling itself yearly, at a rate in excess of the increased production, a condition that is ever liable to exist in the future as in the past which assures possibilities and prices with opportunities for time to come.

In this discourse we have but two objects in view. The one is to show the conditions as they are, thereby to seek to get the present breeders to enlarge their plants, to broaden out, and to reap more of the profits due them. Second, to properly place these questions before others, that are seeking investment and a business that promises so much for all, in health as well as in better conditions and living.

We have often heard the remark, the poultry business would be overdone some day, and that cheap prices would spell failure for the breeder; that is a condition we never expect to see. Thirty-five years in this line with an ever increasing demand bids fair for the future. The rise in prices as well as the increased demand have been gradual, and at no time have the opportunities for success been more promising than right now. The calamity

howlers of some years ago were effectively hushed by the returns of gold for all those that believed in and have grown up with the poultry business.

Many striking examples of these exist, to tell of their success, as well as of the future prospects. While the value of poultry and eggs produced each year doubles itself, or at least nearly so, the demand increases at a rate at least one-third greater; these, and these alone, are the facts upon which we base our claims for the future. The value of these products for food has always been under-estimated, and in this age as they become fully known, with the demand for eggs in the use of arts increasing year after year, it must be evident that there really is something to this worthy of consideration. Still the end is not yet, for as the world grows, so will this demand, which is largely placed on necessity, confidence and principle. As time passes it will ever increase, with promises of safe producing profits for all time to come.

Standard Breeds the Best

Before going further, we wish to call particular attention to the value of standard-bred poultry. Our ideas, as well as all of our claims are based on the value, and the returns to be received from standard-bred poultry. Every detail should be considered, so that every advantage can be taken, and all possible income secured. We therefore advise above all, as well as at all times the standard breeds only, with the assurance that the highest possible gain comes only through them. The breeders of standard-bred poultry can at all times find ready sale for choice breeding and show birds. There is no limit for prices to be obtained for extra quality exhibition birds, while vigorous breeders bring prices that are from five to ten or more times their value at market prices. This is the most profitable side of the business; it is also the one to grow up with, if you desire to attain the reputation with the best of quality and reap the highest prices. Still any one, and in any section, can breed thoroughbreds and sell his surplus of valuable breeders at a profit upward of 100 per cent. above the market value.

While the one object of these articles is to show the possibilities of the practical side of the industry, the above is only mentioned as one argument in favor of the standard breeds, bred pure. It

should be well understood that the practical and fancy breeding combine themselves to the greatest advantage as shown above. If we had other desires in this, and we have, it would be to extend the hand of welcome to all recruits, wish them well and promise them every aid. We can at least at this time assure them that we won't let them go wrong if they will but come to us with the questions they do not understand.

Next in importance is the question of meat, its grain, flavor, etc. These questions must be considered in this, as well as the shape, and general condition of the carcass. Just plain appearance is an important factor here. The very best of quality, with the high average sameness, is only obtained from the standard breeds. We have seen a load of this kind of poultry sell at the Rochester market for four cents a pound above the regular retail price. They were all of the same quality, color, shape and size. This man carried home dollars more than his neighbors did, while the cost to him was no more. It was simply a case of additional profit for the quality produced.

Standard-bred poultry has other advantages to consider. They are more uniform and will attain any given size and weight in much less time, and therefore at less cost than the mongrel hen. It is their nature to mature early. This stands for them to begin laying at an early age. Every egg gained, as well as every ounce of weight gained, adds to the individual value, as well as profit to the owner. It is this worth that is with them, a characteristic, and warrants the greatest number of eggs per head per year.

It is to standard-bred poultry that we look with confidence for the greatest possible egg production, and well we may. The makers of the standard are practical men, who have made a life's study of the characteristics and conditions of the different breeds. They have followed nature's laws in this, and having found its desires, have improved along those lines for years, with a care that has brought results beyond our fondest expectations. With this very important proof in full view, we offer our best argument for the standard breeds, and with a confidence gained by a life time spent with them.

What Breed?

The question here now arises—which is the best breed for general purposes? This would largely depend on several other

questions, as well as on conditions, so our reply to this question, under general circumstances, would be "the variety or breed you fancy." There are several varieties of standard-bred poultry that are practical breeds and will meet every requirement. In this we believe that if individual taste is followed here in this, that then success is best assured. We personally bank on the Barred Plymouth Rocks, and so do thousands of others. Still there are others, and great numbers who have made prominent success with other varieties. They also have their reasons, and the results in their cases are satisfactory, and just as convincing as any special argument that could be made in favor of any one breed or variety. Results speak for themselves. It is the general success we wish attained, so will not, at this time, go further into the question of variety. Location along with personal fancy will best answer this question in a general way at least.

There are also other sources of income from poultry. Feathers if dry picked, or at least properly dried, sell at paying prices, while the droppings find ready sale and their value to the garden, or the corn lot will be found in excess to any other fertilizer.

If poultry only barely paid with us, we still would fancy and breed it for the love and "out of door" work it affords. Here and in this we feel free. The love of nature that is born in all persons is best satisfied with out door work. Healthful and invigorating, with enough variety to please, is to be found in breeding poultry. The work, while exacting, is light and clean, and at all times affords a study of nature that is delightful. One of the great breeders of the day, lately told us: "I find my greatest enjoyment among my poultry, and am happiest when working with and for them.

There are breeders, both of fancy and practical poultry, in every state of the union, that have made the greatest possible success, and whose income today compares favorably with that of bank presidents. There are thousands upon thousands of others whose homes are yearly supplied with the fruits of successful breeding. Your home, dear reader, would add but one more to this great number, while the fruits would also tend to bring more contentment for many.

After all is said and done, still bear in mind: There is today a crying want for more poultry and eggs. In this there is room for



BABY CHICKS FEEDING

The youngsters fighting for a chance at the bran mash in which the meat and bone are added to the amount of about ten per cent. of each. When feeding meat to chicks it is a good plan to provide it in the dry mash.

all, with profit assured. There is positively no danger of over-production, in our day, or in time to come. Present conditions were never more favorable, nor the future brighter, than now.

The Laying Capacity of Breeds

We have and know of many exceptional layers; each flock has its share of these, as well as its share of females that will not lay over 100 per year. Hens that have laid from 200 to 240 eggs per year belong to the select class of hendom. If the breeder was to trapnest his layers and select his best layers of this kind, then the average we give here could be greatly increased. We consider these figures of no value in this article, much as we would like to incorporate them. In this it is a simple question of what a flock of from 100 to 1,000 laying hens can accomplish under fair to good conditions.

We have direct information for this article from twelve breeders of Barred and White Plymouth Rocks, Light Brahmas, White and Silver Wyandottes, Single and Rose Comb Black Minorcas, Single Comb White and Brown Leghorns and Buff Orpingtons. While the size of these flocks varies from about 100 to over 1,000 each, the flock average is given in each case, and I find the average is 162 eggs per head per year. This to us appears to be a very conservative estimate for these birds that are all in competent hands. We personally know of several large flocks that hug the 200 mark closely, but we consider these exceptional cases, while an average of 162 under ordinary conditions looks just about right. This average is taken from figures that ran from 146 to 189, and we have reasons to believe that this best estimate is the result of better conditions and proper feeding only. We would further state that both this low and high estimate is from flocks of Barred Plymouth Rocks.

Along with the reports received we have several from experimental stations that have been compared, and we find that as a rule our figures are quite a little more conservative. This can be accounted for best in the care of housing and feeding used on the government and state farms, and it is right here where the poultryman can learn with profit, if he will but keep posted and up to the times. We may safely take it for granted that by expert handling and feeding it would not be a difficult job to breed a flock

of any of the popular breeds that now average from 140 to 160 eggs per year up to an increase of fully one-quarter more.

The Cost of Egg Production

The cost of egg production varies greatly according to conditions, prices, etc., we have estimates galore that show hens that average 150 eggs per year, paying a net profit of from \$2.00 up each, some run as high as \$4.85 per hen net. There are those possibilities for you and for everyone who will master the art of production, feeding, growing, etc., but for the average breeder under average conditions that rate is too high while a conservative estimate would be about \$2.50 per hen net as we now understand conditions. With all this there is ever that chance of better prices, of cheaper costs and of greater profit which should be fully considered at this time.

The First Cost

In starting in the poultry business the first cost is but a trifle when compared to future advantages and results. We have always held that the best is none too good to start with, and a right start is worth many times the little extra cost. When you buy, buy the best you can afford, always look to breeding quality, for what they are, what they were bred for and what results you will obtain all depends upon their quality.

The Egg Value as Food

The egg as a food to our purpose is a well balanced ration. In composition they closely resemble meat and milk, much more than they do any of the vegetables. From the chemical composition they are shown to belong to the same class as the other animal foods, and may take the place of them. Elaborate experiments, both in this country and Europe, have demonstrated that eggs are equally digestible with other foods of their class and that they are more thoroughly digested than other foods of similar composition. It is claimed that eggs at 50 cents per dozen are cheaper food than beef at 20 cents per pound.

Palatability has much to do with the value of foods, although why this is so is not well understood. Eggs are relished by almost everyone, old and young alike, while meats are rejected by a great many people.

Experiments and Results

We most heartily favor experiments; they are the best of teachers, and if properly made, with an object in view, and the results noted, they are bound to be of great value for future use. Following along the lines of those that have proven successful will lead to the satisfaction and the results we all aim for. Often breeders are told by others what to do and how to manage, and they will follow such advice to their graves, without question. This is not, in our opinion, the best way to attain the best results. Learn all you can from the other breeders; try their advice, but test it and know for yourself whether or not such is the proper care for your stock under your conditions. What may make him may break you. It is your due to receive every possible grain of gain that poultry can give, and the breeder should be alert to his own interests and obtain it.

We also advise experiments for the purpose of creating interest in the work before us. Personal interest is absolutely necessary in every undertaking where full value is expected, and the lessons so learned are not apt to be forgotten. It is a well-known fact that we can mate to produce shape, size, color, markings, and to greatly increase the laying capacity by following close to standard lines, and to do this is something accomplished that carries with it a satisfaction of work well done that will spur us on to renewed endeavors and greater possibilities

Conditions Differ

There are general principles laid down for the poultrymen that are productive of assured success, still we advocate personal experiments to positively obtain the best results. The mode that may be best and proper in New York state may not be the best in Iowa, or in North Carolina, or in California. Climate, food and water differ; each has its value, and as they differ, so do the conditions. It's plainly up to the man. And the best of all is, these questions are so simple to solve where real interest is had.

Feeding Lessons

Here in particular is where the feed question comes in. The food they require, as well as the value of the food from the practical and productive viewpoint, are questions to be considered in.

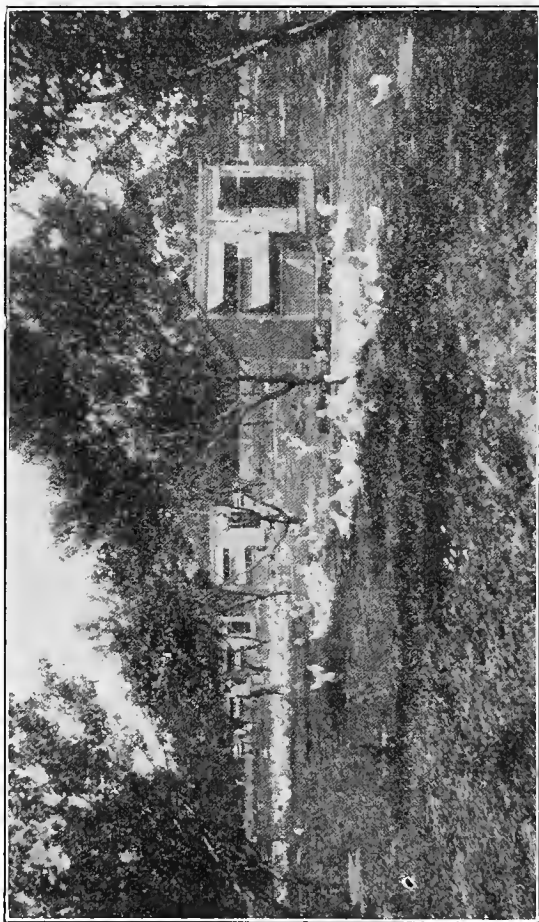
experimenting. Just at this time food is very high, but it is at no time cheap enough to allow its careless use. Along both lines of quality and quantity of food that will be productive of best results, and at different seasons, is where experiments can well be made. Variety is the spice of life, and a balanced ration can be formed that will return all that is possible to receive. The fowls demand a variety, and this variety in such proportion that will meet their natural requirements.

Houses and Housing

For some reason or other, the idea seems to prevail that elaborate buildings are required, that modern heating plants be installed, and that unless all modern conveniences are installed, "Biddy" will not be at all satisfied and will refuse to cash in. At a late Philadelphia show a young man confided his plans to us: he was about to enter the poultry business to make a living, and had elaborate plans, drawn by an architect, of the buildings and interior arrangements, with a hot water heating plant included. All this made a fine picture to look at; its cost was to be \$1,450. Then from \$150 to \$200 was to be invested in stock, and the balance, of from \$400 to \$500, all this young man's earthly possessions, was to be used as a working capital to meet all expenses until the great returns from the plant came in. Now, this is the proper way not to succeed. No one, not even an old and well established breeder, could make of this a paying proposition. Such questions as this have been the stumbling blocks for years, and still we meet them almost daily. We wish we could say, once and for all, that a plain, well constructed building with a shed roof, built as long as you like, with good depth—one that will keep out the weather, top and sides, and with open curtain fronts (to the south), is all that is required. Set it where good drainage is had, and have it plain and simple in arrangement, so that the stock can easily be cared for.

Colony Houses

The colony house plan suits us best of all. We are partial to these for several good reasons, the particular one being for the larger yards they afford and that they can be changed around if wanted. They require more labor to care for the stock and to clean; also, the cost is more. They are of advantage, especially



Out in the orchard where they thrive and grow, making profits and pleasure for the owner.

where the breeding of exhibition birds is the object and the best possible per cent. of fertility is desired. Keeping hens too long in limited yards is not conducive to health, unless the ground is turned under often.

Hatching

Chickens can be successfully hatched by either natural or artificial means: we practice both styles, and the results are about equal. The difficulties that will confront the beginner are more apt to be found in the brooding than in the incubating question. As this brooding question is just now being revolutionized, or rather has been for the past year or two, we think it best for us to hold this up, awaiting further experience and the developments of our own tests. At this time we feel assured that the brooding problems are being properly solved, and that the future poultrymen will have much less to contend with than the ones of the past.

The Feeding of Young Chicks

Here, again, we find recipes handed down for ages; some are good, while others are not as good as they might be; still, most of them will answer, with fair results. We are still old-fashioned enough to feed the finely chopped hard boiled egg, shell included, for the first meal, and to follow with the egg-soaked bread crumbs, etc. For three years now we have fed almost from the first a bought prepared chick food that has given us most excellent results. In both grains and mash foods (either dry or wet) we have for years bought and tried several of the leading brands and have met with grand results. They are properly balanced rations, complete in variety and rightly proportioned, so we can highly commend them to our readers.

Marketing Eggs and Poultry

Here is another question that location as well as conditions will arrange to some extent if you let them. Here again it is up to the man; for, no matter where you are, there are inside, outside and other sides to the trade and demand, as well as to price. You can better existing conditions. Get out of the rut. Lead, and let others that will, follow. Don't be driven. Have the quality; insist upon that, and make your own terms. This may come slowly, but it will come. Reliability and quality will assert themselves, and the advantage is your gain.

There are poultrymen today that are selling all the eggs they can produce for from 60 cents to 75 cents per dozen the year 'round; others we know of are selling at from 30 cents to 50 cents, and we have lately heard of one party who gets \$1.00 per dozen the year 'round for all the eggs he can ship. These eggs are all used for commercial purposes, and not for hatching, as some may suppose. They have made the demand for their goods and are now reaping the rewards in dollars. Their goods are worth it, and the people will pay the price just as soon as they know they are getting value.

The marketing of dressed poultry has the same sidelights; it offers the same class of markets, with extra profits in proportion. The quality of the article makes the price; no quality is too good, and no price too high; by giving the best you also receive the best. If your home trade does not demand such goods, then look elsewhere, for there is just such a market looking for you. The cold storage kept carcass days are as far gone as are the rumored embalmed beef days, and all these questions have drawn themselves to the fine point of quality, where it rightly belongs.

Capons

The capon question has never come to our personal experience to any great extent; we have caponized a few for home use, and have fully enjoyed their delicious quality. We know of several who look to capons as the best thing there is in poultry raising. They have made it a regular business for some years, with profit, and, knowing this, we gladly add our O. K. The price of capons is usually from five to ten cents per pound above the regular poultry price—well worth considering, along with the added weight obtained. With but little practice, by the right party, the operation can be quickly and easily done, and with a very limited, if any, loss. There is always a demand for capons in the larger cities that is seldom over half supplied, assuring at all times the best possible markets.

Fruit and Poultry

In concluding this article, we call attention to the addition of fruit with poultry keeping, as some may suppose that the yards and range required cannot be utilized for any other purpose.

This is far from proper, as there is nothing quite as good for fruit trees as poultry, not even excepting the birds. Fruit is without doubt the best paying crop that can be grown, and should receive every encouragement. The care and harvesting of fruit crops is pleasant work, and easy compared to the regular working of the land, with much greater profit, besides adding value to the farm.

One of the best flocks of chickens we ever saw was raised and kept in a berry patch. Here the cultivator was used every week, the poultry doing the rest in growing the grandest crops of fine large berries that paid the price of the land in three years. The poultry, in working among the bushes looked at all times as if it had just come from the laundry—so bright and sleek, as if ironed out.

We find that in this article one question leads to another and that we are still far from the end of possibilities of the poultry business. If we can make this article read as interestingly to "our folks" as its writing has been to us, and if we can be the means of creating additional interest or of leading others in the path of successful poultry breeding, then we shall feel repaid in full.



CHAPTER II

THE VALUE OF SHAPE IN BREEDING.

By CHARLES D. CLEVELAND.

What is breeding and what are the objects for which the breeder is striving?

Now that so many persons are for the first time embarking in the poultry business and are entering a field where the chief assets of the beginner are confidence in himself and entire ignorance of the principles of his newly acquired business, these questions will have to be asked and answered.

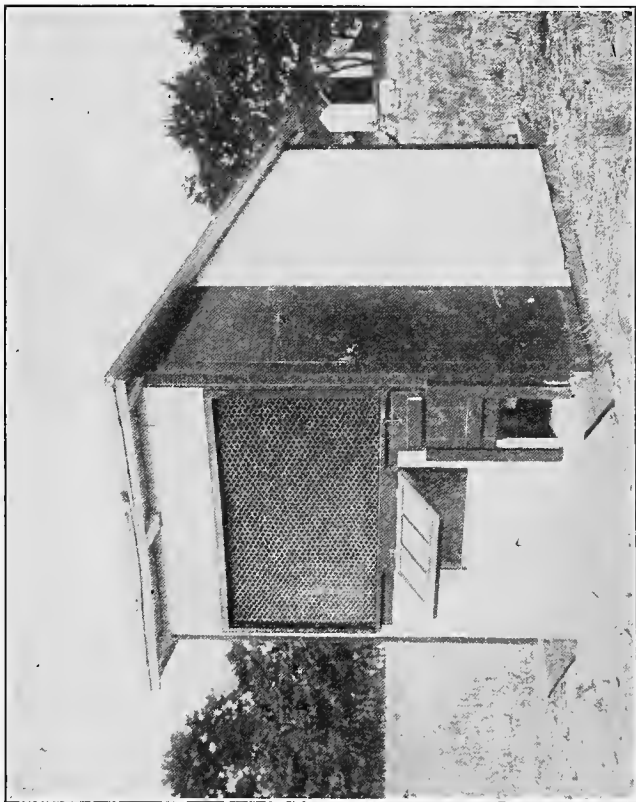
Of late years I have been visited more often than ever before by persons seeking advice, who tell me that they have never raised any chickens but that they believe that there is "money in the business" and as they are tired of the city with its confining surroundings, they want to buy small farms and start with poultry. My first question always is, what objects have you in view? Do you intend, ultimately, to become a fancier and raise exhibition stock or do you intend to go absolutely into the commercial side of the business for the production of eggs and meats?

It is surprising how few of the beginners have actually made up their minds just what they intend to do and in fact I know of no class of business men who would have the temerity to put their whole savings into a new venture with so little forethought as the majority of these "newly hatched" poultry enthusiasts. It is indeed astounding that some men and women should take such an important step without having first given it more careful consideration. Live stock raising of any kind is something which requires a disposition and constitution particularly adapted to this sort of work. The ordinary persons will not succeed and no one will succeed unless his whole heart is wrapped up in the proposition. So it seems to me strange that more persons have not decided before they take the step, whether they were to be purely commercial men and women or whether they intended to become breeder-fanciers. It is, therefore, fitting that considerable thought and attention should be given to the solution of the question, what is breeding, before one decides to breed or what variety to raise.

I do not mean by these remarks that the commercial poultryman is not a breeder and in a certain sense a fancier. It takes almost as much knowledge of the game, fully as much perseverance, intelligence and labor to produce a strain of heavy layers or remarkable table poultry as it does the finest families of our Standard-bred fowls, and too little praise is often given those who after years of endeavor have succeeded to an astonishing degree from the utility side, but my remarks in this article are chiefly directed to the fancy side of the poultry calling. They are intended to fit in more closely to the thoughts and desires of the fancier-breeder rather than the man who has but a single object in view, either the production of eggs or table poultry.

Breeding, of course, is more than raising. It is more than the hatching of a definite number of chicks, the raising of a majority of these chicks to maturity and the placing of them in the winter houses where careful feeding will produce an abundance of eggs. The farmer's wife with her mongrel crop of all sizes and colors is a raiser, but she certainly is not a breeder; nor is she a fancier and in nine cases out of ten she will embrace it with enthusiasm and become successful. The farmer's boy, one of whose irksome duties it was on his father's farm to be compelled to feed the chickens and clean chicken houses, is a raiser only, but give him the opportunity of going to a first-class poultry show and his father's consent to buy a few pure-bred chickens, and in a great majority of cases he becomes enthusiastic and matures perhaps into one of the leading poultrymen of the country.

Now these persons who give up mongrels to go into pure-breds must have definite objects in view. The first thing, of course, is for them to decide upon the variety or breed which they fancy. This opportunity is given them by seeing pure-bred flocks in their neighbors' yards or show birds in the poultry exhibition—and they generally make up their mind at the start to breed five or six varieties. They want to see which one is the best suited to their particular locality or to their own personal fancy and too many of them keep breeding more than one or two varieties; for, as will be pointed out, there is danger to all but the most experienced in endeavoring to be a breeder of several different types. The ordinary individual having decided upon the breed he will adopt buys a few high class specimens and starts in. He has chosen either Rocks, Wyandottes, Leghorns, Orpingtons, Cochins, Brah-



SPECIAL MATING HOUSE

The special mating, carefully selected for breeding purposes, should be specially housed apart from the balance of the flock where they can have ideal conditions of environment. Such an ideal house for a small pen of breeders is here shown.

mas or any other of the Standard-bred fowls, and not having prior experience is at first greatly confused over the apparent similarity between the shape of some of his Plymouth Rocks and the shape of some of his Wyandottes. It is very hard for him to see the difference between the shape of his Anconas and the shape of his Houdans and, in a great many cases where the colors are the same, he can get no definite idea as to what the shape he is after should be. Now the most important axiom or expression in the poultry world is this, "shape makes the breed and color the variety." The old saying has been repeated thousands of times in hundreds of articles. It has been expressed millions of times to thousands of persons—and yet it has not fully made the impression it should. Shape makes the breed. This means, of course, that each breed of Standard-bred fowls has its own particular shape or form which distinguishes it from every other breed and the beginner must concentrate his attention upon this proposition. He must learn absolutely the correct shape of the fowls he is breeding, and he must make the shape so pronounced and clear to the eye that any one will recognize his fowls as belonging to a certain breed purely for their shape.

It is little wonder that beginners have been confused as to the type or shape when, in the show room specimens of different breeds have been exhibited that look so much alike in form as to be scarcely distinguishable. This was, of course, the fault of the exhibitors and fanciers who showed these birds. They had not taken sufficient pains with their flock to concentrate their energies in producing birds of absolute definite and unique shape. The beginner (and indeed the old hands) had better buy a Standard of Perfection if he has not one already and spend his evenings in going over the shape of the different breeds with the utmost care and attention so that he may acquire a distinct and definite idea of the ideal which he shall have in mind in mating up his birds. Without this definite idea little or no progress can be made and it will be found that one breed, if not carefully bred as to form and type will take on characteristics of other breeds and become practically useless as a Standard-bred chicken. It is very noticeable, especially in some of the smaller shows, how near alike in shape some of the Orpingtons and some of the Wyandottes are; how close in general outward appearance some of the Cochins and some of the Brahmas are—and so on through the list. This

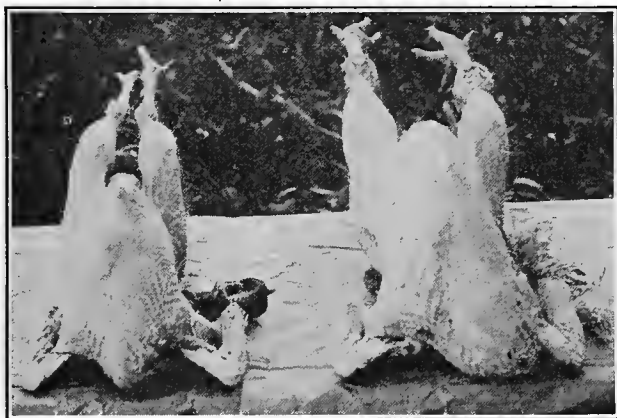
is a dangerous thing and must be avoided at all hazards, for remember it is not color that makes the breed but shape, and color makes the variety of that breed. Some people seem to have the impression that because a chicken is barred that it must be a Plymouth Rock.

It is therefore, absolutely essential that the consideration of type or form be the first thing upon which a breeder's eye must be directed. The difference in the shape between that of a Plymouth Rock and a Wyandotte is as great as the "unlikeness" existing between a Minorca and a Leghorn if one only looks close enough; and, therefore, the object of the breeder is to look close.

Keen observation is the keynote of this whole business. The eye must be trained to appreciate small differences and to carry them in the mind so that if the heads of two birds, one a Wyandotte and the other a Plymouth Rock, are covered so the observer cannot see them, he should be able to pick one from the other at a glance.

Now there are important reasons why each breed should have its own particular shape or type. The history of the breeds, so far as we are able to learn it, will show that they have been built up with patient care but they started in each case with different ancestry; and the breeders and fanciers who brought the various types in each instance had definite objects in view. How absurd the delicate and refined Leghorns would look if they had the shape of Plymouth Rocks; how much a Brahma male would lose his dignity and general appearance if he were formed like a Leghorn male. How dumpy and cumbersome looking a White Wyandotte female would be that was formed like a Cochin. And yet, take each of these breeds, put on it the type it should have and how beautifully it fits the bird in every respect. The long back of the Plymouth Rock with its rather low carried tail and single comb just fits a bird of the Plymouth Rock style and size and the height and length of the body sets off the other sections to the best advantage. The graceful curved lines and close fitting rose comb of the Wyandotte are just suited to this kind and weight of bird and produce a wonderfully graceful, yet active type; and each of these varieties is useful along its own line. The Wyandotte has a great reputation as a winter egg layer and as perhaps the best broiler; the Plymouth Rock is well known as a good layer and a fine market type, especially for roasters and soft roasters. The

Brahma used to be one of the best winter-laying varieties and is probably more extensively used than any other fowl today in the soft roaster trade for crossing with other breeds. And so through the various breeds you will find that each size and type particularly fits the disposition and usefulness of each breed. And again, if the first consideration of the breeder is not directed toward type there can be no uniformity among the various flocks in the country as to shape. It is most desirable that the leading breeders of each breed agree, in so far as possible, even in small details, as to the shape of their favorites. There never will be absolute uniformity of type because all men cannot see exactly alike but the



Large and small roasters, plump, well meated in all sections and tender, for they have been quickly and well grown and properly fattened before killing.

efforts of the specialty clubs have done much to create greater uniformity of shape and form and should be encouraged to the limit through the yearly publications of these specialty clubs; in the discussions between fanciers at the show, and by study.

Visitors at our farm are often astonished to learn that we know the birds apart. They cannot see how this is possible, especially where a large number are housed; but there is of course nothing wonderful about this. It is simply evidence that we have cultivated our observation and this every breeder must do if he finds, as I have quite frequently seen, that he cannot tell one bird from

another. Then he must devote all his leisure time to the careful examination of each individual, for no two chickens are alike any more than two persons. This is the keynote of a breeder's ability to fix his type in his brain. He must, of course, have definite ideals as to what he is striving for, as has been said, but he must also have the ability to see his ideal type when it is before him in the yard and he must then direct his labor toward making all the other birds of his flock look as much like this ideal specimen as possible. This can only be done by judicious line-breeding which will be treated in a subsequent article.

As a general proposition it may be said that the shape of the offspring will resemble that of the hen and that the color and fancy points come chiefly from the male. I will not go into an elaborate discussion of this proposition which like any other has its exceptions, but simply state the proposition as a guide by which the breeder can improve the shape of his flock. Once having decided upon the ideal type, females carrying that type should be selected for the breeding pen, and if they prove good breeders, be retained as long as they lay a reasonable number of eggs. It is wonderful how short a time is required to improve the type of a flock of fowls if careful attention is paid to this point alone; but it will be a long time before the correct type is absolutely fixed in the flock, especially if line-breeding is not resorted to, because one must always remember that a considerable number of the chicks each year will revert back to ancestors whose shape was not just that desired. I should be perfectly willing, after having bred White Wyandottes for upwards of twenty years, if I was cleared out to start over again with a flock of birds that had as near the desired shape as possible, irrespective of color, and I would for a number of years, solely with this shape in view, pay little or no attention to color until I had this type firmly in all my chickens and this I believe to be the proper principle, and not to be drawn into using birds of bad shape in the breeding pen simply because they have good color. It is truly painful to see at times birds of the most grotesque and awkward shapes winning in the show room because they are very beautiful colored birds. These birds cannot be distinguished from the ordinary dung-hill fowl by their form but are given definite names because they have pretty feathers. Remember again that it is not color that makes the breeding shape. Shape makes or destroys the bird.

CHAPTER III.

THE VALUE OF COLOR IN BREEDING

By CHARLES D. CLEVELAND.

In one of my articles published in Everybodys Poultry Magazine, I endeavored to show that "shape makes the breed"; that without typical shape there is no breed, and that the Standard shape of each of the various breeds best suits the purpose for which that breed was originated.

The object, therefore, of each breeder in the beginning is to satisfy himself as to the proper form or shape of the fowl which he intends to breed and once having firmly established this form he must look to the color scheme of his variety.

It is always a subject of marvel to me how diversified is the taste of mankind and how ingenious his labors; for we have only to open the pages of the Standard of Perfection to see almost at a glance how numerous are the varieties of the various breeds (each differing from the other in its color pattern) and we know today that every one of these Standard-bred fowls, and, indeed, others which have not yet become Standard, are bred by various persons all over the world. The man who has chosen the partridge color as his favorite is so enthusiastic over this coloring that he sees comparatively little beauty in a solid colored specimen, whereas the breeders of the white, black or buff varieties insist that these are the only really beautiful chickens there are. Thus we find that no matter how diversified the tastes of breeders are there can always be found a variety which in color absolutely suits each individual taste.

So the new breeder having picked out, first, that shape or style which best suits his eye as to the general form of the chicken he wishes to breed, must choose a color which to his mind is best suited to that particular breed and to which he wishes to bend his energies in producing exhibition specimens; but before this fancier starts to finally make his choice let him remember that there is no one color that is easier or safer to breed than any other color.

I have often heard people say, "Well, of course, John Smith had an easier task in producing that solid white bird than John Jones did in developing that parti-colored chicken over there." This is error, and all you have to do to prove it is to try. I must assure the gentle reader that if his main aim or object is to pick out a color which he believes will be the easiest to breed that he will find it a very difficult task. Each color presents a problem, difficult of attainment, and which will take patient study and work to perfect.

And this is entirely as it should be for were it really easy to breed any one of the various colors to anywhere near its real perfection there would be no fascination about the art of fancy poultry breeding, and most fowls would soon degenerate into that particular color which nature indicated was the easiest to breed. Therefore, in picking out that particular color which best suits his artistic sense the breeder need only look along the lines of his natural choice or preference and it is just as easy for him to breed show fowls of one color as it is any other color.

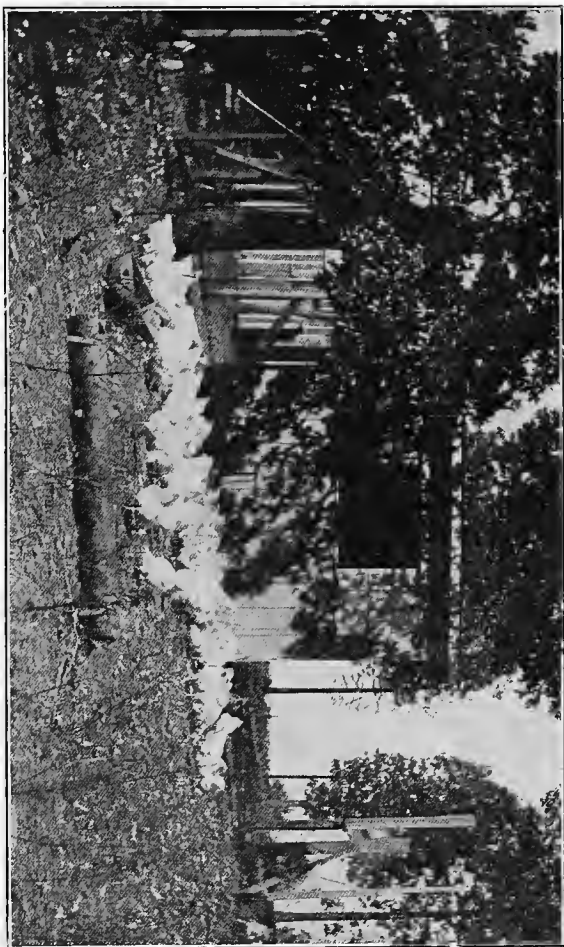
I say make your natural choice, take that particular color which pleases your eye and which you think will continue to please and stick to that color. You will encounter difficulties, everything will not be easy but it is only those things which are difficult to attain which give real pleasure.

Now you will observe that in most all of the breeds you have a wide variety of choice in color; take for example the Wyandottes and Leghorns. Among the former we have the Silver Laced, Golden, Partridge, White, Black, Silver Penciled, Columbian, Blue, Buff, Pyle, and no doubt others will make their appearance. In Leghorns we have the White, Black, Buff, Silver, Columbian, and others. Each has its particular fascination for a certain number of breeders, all are bred to great perfection, but real perfection has never been attained in any and probably never will.

One of the values, therefore, of color in breeding is to develop a very keen sense and appreciation on the part of the breeder as to just what color is Standard and therefore what exact tone or shade of color he will strive for in mating up his birds. This requires again closeness of observation, a good eye for color, and, particularly, a thorough appreciation as to how far short of the ideal the bird really is. If we assume that no perfection of color-

Pullets reared on range during the Summer grow into big, healthy layers that help to fill the Winter egg baskets. Quality of stock adds to the quality and quantity of eggs. Always aim to produce the best.

RANGE HOUSE AND FLOCK



ing (any more than of type) has as yet been secured we must see clearly in what respects our fowls lack in color, and this I take it is the fundamental and primary thing which must be implanted in the mind or eye of the breeder at the start, viz., what color is he striking for and what is the ideal color he wishes to secure. The second step in the progression should be, how can the breeder retain in a majority of his flock the color of his best specimens; and thirdly, how can he so perfect his blood lines that this color will reproduce itself year after year in the offspring. These are the problems (really great problems) which confront every breeder today and have always been the points upon which days and nights of thought have been spent. Ordinarily speaking it is far better, especially for a beginner, to make a final choice as to color and stick to that one color to the exclusion of all others. He will find it difficult enough to breed this color anywhere near a state of perfection without starting in on any other colors. So if one is breeding White Plymouth Rocks it is generally a dangerous thing to start in with any other color of Plymouth Rocks; and the man who changes yearly to suit what he thinks are the changes of the times, so far as the marketability of his birds go, will generally make a failure. It is a matter of difficulty to breed a truly white bird that will stay white under all conditions. It is no easy task to breed a bird with pure white plumage and a real yellow beak and yellow legs and these propositions, as stated before, will keep the ordinary man fully occupied and he would have but little time to give to the solution of other problems.

This is not intended to be in any way a treatise on color breeding but simply to very briefly point out some of the values of color in breeding, and even a casual observer will notice that there are two kinds of color, that is surface color and under color. Personally I believe that the object of the breeder is to produce a surface effect. What he is desirous of doing is to have his birds look right on the outside. He knows that the public, as a general proposition, is not interested in the color of his fowls except so far as it sees them in the yard or in the exhibition pen, and he also knows that the public has not had time to give, and never will have time to give, any real consideration to the under color. I believe that practically no consideration should be given to under color in a show bird and in an article I expressed my reasons for this opinion; but from a breeding standpoint under color is of importance and the breeder will have to give careful consideration

to it. You no doubt have read articles in the poultry press to the effect that there are several kinds of white. First the white feather which breaks out of rather a pink quill. This white feather is always white. Second, the white feather from a yellow skin chicken which comes out originally quite yellow and becomes white after the feather is entirely matured; so in examining the under color of these two kinds of white chickens one would naturally become very confused unless he knew that in the end both would be white. He would think upon an examination of the color of the yellow quill chicken that it never would amount to anything and if he would dig under the surface color of almost all the varieties of Standard fowls today he would find like problems. One man may produce a string of black birds with light under color and another may produce an equally black strain with dark under color, and, therefore, no absolute strict rule can be laid down, but it is a safe proposition to say that in considering the breeding question one should remember that a dark color can not ordinarily be produced by a light color. In other words an abundance of color pigment is necessary in the under color in order to hold surface color without fading.

In the Columbian Wyandotte for example a number of breeders differed wholly as to the exact shade of under color which it was desirable to describe in the Standard and which would produce the proper surface color and breed males that would be free of brassiness. One person asserted that it was only the birds with white under color that were worth breeding as they were the ones that would produce specimens with clean, clear surface color on the backs. Another stated that dark slate was the only proper color, because this produced the sharp black points that were desired, and that the males from birds with such under color did not show brass. The revision committee in this particular case finally adopted as under color that described as bluish slate.

So you will find that both surface and under color are the subjects of very careful thought and study by the breeders, and I say again that one may produce results one way and another another way, but no matter what under color you believe is the proper one for your particular variety you must proceed carefully in order to breed that particular under color which you have found produces the particular surface effect; and a flock should be chosen as uniform in under color as it is in surface color. Therefore, the study of color in breeding cannot be confined to surface color alone but must involve under color and the problem is there-

fore made doubly interesting. So also the color, not only of the plumage but also of the skin, must be carefully gone into. It will be found that all good breeders not only give their attention to the fancy points of their fowls but also to their utility qualities as well and the skin to my mind has a great deal to do with the utility qualities of the bird. We know that certain colors of the skin, which of course are shown in the leg and beak, are not as desirable for market purposes as other colors and are not as pleasing to the eye. Take for example a White Wyandotte with flesh colored legs; it is hard to sell and distasteful to the eye. Naturally the color of the skin is important from the breeding standpoint for in almost all cases it will be found that the proper color of the skin in each variety will have a tendency to produce the proper surface color, although exceptions to this rule will always be found.

In addition to the color of the surface and the color of the skin one must also consider the color of the eye which is a very important consideration. A Black Orpington with a pearl eye is a very sad sight and it is extraordinary how greatly this defect injures the whole appearance of the bird. In my case it is natural to look first at the head and eye of a chicken on first seeing it and if my first impressions are bad, it affects my whole opinion of the specimen; and it will also be found that not only will the wrong color of the eye injure the appearance but that also once used it will be a very hard thing to eradicate from a flock. Under no conditions should a bird be used in the breeding pens whose eyes are not of the right color.

But aside from these general observations as to color I believe that the most important thing in connection with color in breeding poultry is that it teaches patience.

Americans are pushing, active people and desire to attain an end as quickly as possible. They are impatient at any delays and often over-step the mark by too hasty actions. Taking up the breeding of any one of the Standard varieties of fowl will necessarily do such persons a great deal of good. They will see after a very short time that, in poultry breeding at least, great strides cannot be made in a few minutes; that it takes real patience as well as perseverance to breed really good chickens and that there is always room for improvement. Many a man who starts out with a tremendous rush, lots of enthusiasm and a firm conviction

that it will only take two or three years of breeding to perfect a certain variety and then he can go to another is still patiently waiting to produce one specimen which he can truthfully say is anywhere near perfection. Now this is a very valuable thing, for patience is difficult to cultivate and it is one of the great virtues; and coupled with patience, as stated before, comes observation and we all know that this is one of the attributes that most persons are sadly in need of. How often have all of us overlooked a defect which a stranger has pointed out at a first glance?

This is a rambling "discourse," but suffice it is to say at the present time that the poultry lover will find that among the values



Chicks raised under such conditions cannot help but grow into hard and strong vigorous stock.

of color in breeding are: First, that to attain it teaches patience, perseverance and observation; and second, that there is involved in color breeding, not only the consideration of surface color but also under color and color of skin as well as color of eye, and that when all of these attractions are added together and a persevering effort made for improvement the fancier will be very closely tied down to his breeding yards.

CHAPTER IV.

**HOW BEST TO IMPROVE THE UTILITY OF
STANDARD-BRED POULTRY.**

By PROF. W. R. GRAHAM.

The increasing demand for what is termed purely utility stock and the diminishing demand for exhibition stock of the second grade suggest that the public at present is considering poultry from a purely economic basis of eggs and meat. There can be no doubt in the mind of any reasonable person but that exhibition poultry has done much for the industry. It is equally true that in some instances at least, the fancy ideals have worked to the injury of the particular breed or strain, perhaps not from the viewpoint that the ideal was, in itself, absolutely antagonistic to the utility qualities of the specimen; but that the utility qualities were ignored. The crux of the whole situation is that people put forth their best efforts ordinarily along lines which affect their pocketbook.

If we accept the above as true, and consider the prices paid during the past ten years, as fair indication of the times, it appears to the writer that the purely fancy points would certainly be well developed. Again, if we take the present inquiry for purely economic poultry, as the indicator at this time we of necessity must expect exceptional demands for hens that lay a large number of eggs. Personally I do not believe either ground is in itself the best one. What is wanted is hens that lay at least an average of twelve dozen or more eggs that weigh two ounces or better. The eggs must hatch well and the chicks live and grow quickly. The demand is not only for high producers, but producers of good-sized eggs. A neatly dressed bird is required, in order to sell the surplus cockerels or the old hen. Last, but not least, the economic point is how many eggs set does it take to represent a pullet ready to lay.

Taking the above into consideration, the question of how best to improve the utility qualities of Standard-bred poultry is not

so difficult, providing we do not change our standards, except in cases where the type now used is absolutely proven to be inconsistent with the characters required by the utility breeders. It is all very well to talk of high or low tails, wide or narrow barring, etc., but I very much doubt if any one can say positively that these styles in themselves are harmful. It is probably true



COLONY BREEDING HOUSE

A colony breeding house for a dozen choice birds is a valuable asset to the poultryman's house equipment.

just at present that few birds of the best utility qualities have these characters.

We shall have to sit down and figure out calmly what is wrong in Rome. We are inclined to get hot under the collar when criticised but one has to learn by hard experience that friendly criticism is good medicine and that each and all of us are not perfect.

The mode of procedure to bring Standard-bred poultry to meet the utility requirements are not so very difficult and the breeder

who reads the signs of the times correctly will be ready for the harvest. Breeders of exhibition birds know the general principles of breeding and selection so well, as an art, if not as to the purely scientific reasons for their results, that it would be folly, here to even suggest plans in detail to their breeding operations.

If the breeders will permit the writer to suggest the points in which he has found exhibition poultry to be weak and the same is true in some respects of high layers; the following characters need improvement:

Chickens are a nuisance when lacking in constitution. Robust, healthy specimens with lots of ginger, spunk, or kick to them are wanted. The constitution is the main-spring. Of what use is a very fine watch with a weak main-spring? If the watch will not tick regularly, the time indicated is not reliable; so a bird with low vigor is not reliable. Pass by as breeders some very fine show birds for lack of vigor.

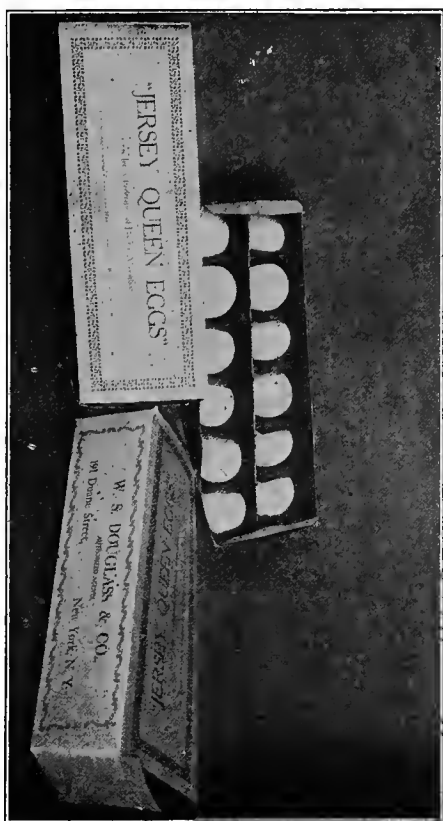
A hen must lay about one hundred eggs a year to pay for her keep. Most people do not like to keep chickens but prefer chickens to help to keep them. That is natural, and who likes his neighbor to get more eggs per hen during the period of low egg production than you are getting? Furthermore, small, badly shaped eggs are a worry, to say the least.

It is not an uncommon phrase to hear that the more you pay for settings of eggs the fewer chickens are hatched. Fanciers are pleased if they get a few good ones, but the farmers want eggs that will hatch a high number of chickens that live. All this means that it would be well to pay more attention to the chicks from hens whose eggs hatch well, and whose chicks live.

Life is short and at this day and age the demand in nearly all classes of live stock is for quick-growing stock. A pullet that begins laying after seven months of age is seldom profitable. This means a selection of birds that grow to good size and mature quickly.

The poultryman of the future, who reaps a big harvest, will have hardy, rapid-growing stock that lay plenty of good-sized eggs that hatch well.

In conclusion the writer expects to see shortly, in the advertisements, a special placed on size, color and hatching power of eggs.



Common types of 2x6 cartons. These are durable and handy, their use admits of grading and guaranteeing by the producer.

CHAPTER V.

RAISING POULTRY FOR RESULTS.

By ESTELLE E. COLLIER.

It is the worst sort of foolishness to raise poultry of any sort at any time or in any place if not to get the most profitable results. A great many people say when they begin that they are not in the poultry business for profit, but merely as a recreation and a pastime. To admit this, or say as much, is to admit that the experiment is a failure as far as results are concerned.

No one should enter any business on a small or a large scale except to get the most for the efforts expended and financial profits. Even in a matter of art where the sole effort is supposed to be the highest and the mere matter of recompense of no consideration the very fact that big sums can be gotten for a picture or piece of sculpture spells success.

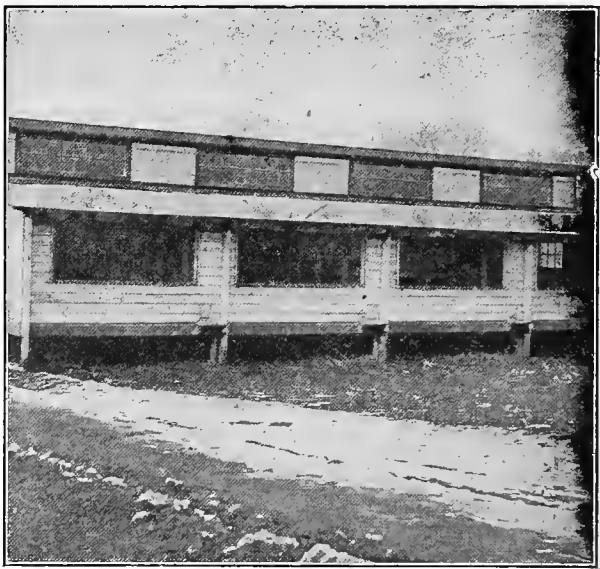
Raise poultry for profit. Get the best results that can be had from the most efficient service and you have a success equal to any and a pleasure that can be spelled in dollars and cents. It has been truly said that we Americans are a nation of the almighty dollar. That is not so very much to our discredit. The Old World is on a quiet hunt for the almighty dollar and is not condemned simply because they fail in their efforts to get it. We are successful and are therefore condemned. It has been said that a man's friends are known and can be counted by his enemies, and the enemies of the poultry industry are counted thrice over by those who are succeeding in it every day and year.

Many a small poultry yard on a back lot in the city has caused the owner to move to acreage outside the city limits, and poultry raising. When the promoter of land sales wants to boom his particular locality he puts up a small bungalow and a hen house with a string of chicken runs attached. That insures the sale and the small land holder starts out to make his flock of hens keep the family table.

One woman in our neighborhood whose husband was hurt and unable to work for the family, kept the family out of debt while he was laid up by selling the eggs from her chickens kept in the back yard. They were fed on the table scraps and every day hens laid enough eggs during the winter when eggs were selling at fifty cents per dozen to pay the running expenses of the home. They got a cow and sold milk but she said that it paid better to have that flock of hens to keep up the table than to sell milk at ten cents per quart and pay for feed for that cow.

One man outside of Tacoma started a twenty-acre ranch, using only about five for a large flock. He was one of your utility breeders who wanted eggs for the market and fowls for the meat market, believing that fancy stock cost too much to be profitable. Not being a fancier and depending on the local markets he did not have anything to advertise. One day he went to the poultry show at Tacoma and there met the breeders of pure breeds and talked to the poultry magazine editors. Tacoma is a place where these editors abound during the poultry show. This man who had no use for fancy stock and said he had nothing to advertise was struck with the uniform beauty of some White Leghorns. He made the claim then and there that he had some birds as fine as those at home mixed with his mongrel flock. He talked about it and investigated the whereabouts of the breeders of those White Leghorns on exhibition. He found that his own stock came from a bunch of culls sent to the market by one of the popular White Leghorn breeders. He grew quite enthusiastic. To have something of value where he thought he had mere mongrels fired his imagination. He went home and put all those white hens of his in a pen to themselves and surprised his wife out of a seven years' growth by buying one of the ten-dollar cockerels on sale at the poultry show. The next year you could see his flock of White Leghorns across the prairie for a mile. He paid little attention to the setting of any eggs except from this pen of white birds. He knew they were started from culls, but he was gambler enough to bet that he had as good stock coming on as those he saw at the show. They certainly did look fine and it took him another year to find out that the bird that carried the tail too high was not as good as the bird that carried it according to the Standard. He found it hard to believe that the "brassy" look to his finest, biggest birds was a detriment, but as the different breeders came and

spoke of having the mongrels running in and out of the yards spoiling the appearance of his place he got disgusted himself. Finally, when his flock reached immense size and people came miles to get eggs for hatching he conceived the idea of advertising and charging more than the market price. From then on he became a successful breeder. He is now a consistent advertiser and knows that it pays to buy good birds to keep up the stock to the Standard. He points with pride to the birds that are being



A modern breeding house on a modern plant.

groomed for the head pen for the next year and though he still raises for the meat and egg market he does so with pens of white birds fit to enter in the poultry shows in competition with the best on the Coast. He has culled and bought good male birds until he can point with pride to the results to be obtained from looking first to the fine quality of the male and then selecting the females for qualities lacking in the male.

This breeder has a large feed house with an engine to grind the green bone into meal and a large mixer in which different dry foods are mixed properly. In his houses that hold about a hundred birds are large dry feed hoppers, always filled and ready for the birds. In one hopper was the dry mash and in another mixed grains. In a wire rack against the wall was some cabbage that the hens picked at. Every other chicken yard was in use while in the alternate yards the green food was growing. This gave one continuous round of chicken yards in which the growing things were ready for the foraging hens. Any hen would lay well kept under these conditions. Such a thing as a pen of chickens that would not produce well was unknown on this ranch.

One thing was plainly demonstrated to this breeder. He could not stay in the poultry business without advertising. It seems an expensive thing during the dull season but one good bird sold at a good price will pay for months of advertising. If you have what the other fellow wants he will want it badly enough to pay a price worth while. It is asking too much to expect a breeder to go through all the work he does, selecting his breeding pens year after year and following up the poultry shows, increasing the value of the flock from year to year without asking a high price for the best birds in the flock. Only through advertising can you get to the trade that pays the price. The man who doesn't believe in advertising does not believe in paying above the market price for birds unless he has something to sell. You must go where you have a market if you have developed something worth while and only through the columns of the poultry press can you find this market.

That is what raising poultry for results means. Raise your pure-bred birds for sale in the best market the country affords. You will find this market listed in your poultry journals. You can find there just what you want, the winner of any show, the record back of the bird you would like to see at the head of your prize pen. Only from such can you get your blue ribbon birds. Winners are seldom a happen-so. The mongrel pen may throw a winner once in ten years, but you will find on investigation that that winner had parentage of which even you were unaware. Blood will tell.

CHAPTER VI.

THE INCUBATOR CELLAR.

By WILLARD C. THOMPSON.

Environment is one of the important factors that influences nearly all poultry operations and plays a controlling part in the successful production of all types of poultry products. It is one of the fundamental agencies in the production of eggs, particularly during the colder months of winter, and is one of the most important factors in the steady, and continuous growth of youngsters during the summer season. But it enters the poultry business at even earlier stages than these, because it affects the quantity and quality of the hatch, the starting point of the poultryman's work. The place in which an incubator is operated and the manner in which it is cared for measure very accurately the success or failure of the venture, assuming that the quality of the eggs is up to the standard.

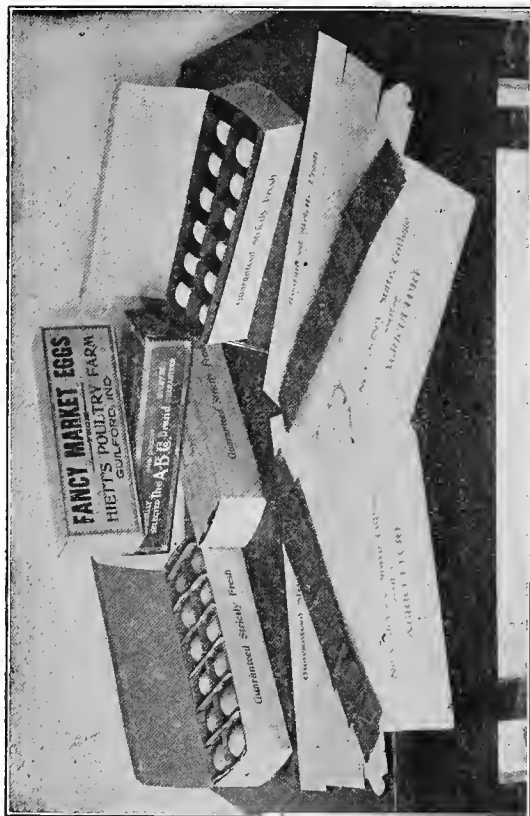
The last few years have witnessed the steady growth of the artificial incubator both in number of types manufactured, popularity among poultry raisers, and in necessary demand. The tremendous increase in the poultry business has given rise to the demand for a method of hatching eggs that would decrease the labor involved and cut down on the expense of this side of the business. Because of the greater convenience, better economy, and general adaptability to the demands of the poultryman of this method of hatching eggs, many poultrymen have adopted the system, and many farmers who plan to raise but comparatively small flocks are making use of incubators. This increasing interest in the artificial incubator has brought out a question of utmost importance. In what kind of a room or under what kind of environment must the artificial incubator be kept? There are two answers to this query. One will apply to the poultryman who plans to hatch large numbers of eggs each spring and who will make use of several machines or larger types of machines. The

other answer will apply to the general farmer and to the small poultryman who operate a small number of incubators and who do not feel that the building of a special house is warranted. There are certain qualities that must be found in both answers.

General Requirements for the Room

The room or place in which an artificial incubator is to be run or operated must be selected with care, as it will materially influence the success of the hatch. Having an incubator in the right kind of environment will not only help to insure better results but will make the attainment of satisfactory hatches easier and obtainable with a minimum expenditure of labor and worry. After having obtained a machine consider the following qualities before definitely selecting the place in which the machine is to be located:

1. The temperature of the room is one of the chief factors that will make a room suitable for the operation of an incubator. The temperature should be as nearly uniform day and night as is possible to obtain. There should be little difference between the degrees that are prevalent at the noon hour of the day and those prevalent at midnight. This uniformity in temperature will help to keep the temperatures in the machines more nearly uniform and regular. A room which is subject to decided drops in temperature as soon as the sun goes down is not the most desirable place in which to run an incubator. The thermostats on the machines can take care of small ranges in temperature but not drops of several degrees. If one is to operate a machine in a room which is subject to falls in temperature constant attention must be given to the adjustment of the flames and the thermostats during the night. It is to get away from the necessity of this constant attention and extra labor that a room of approximately even temperature is desired. This factor can be obtained on most poultry plants or farms by either one of two methods or a combination of both. In the first place, select the room or place with regard to this factor, if possible. In the second place regulate the room temperature by means of some source of artificial heat in the room. Where steam heat is available this is a comparatively easy solution of the problem, as the heat can be turned on or off to suit requirements day or night.



SELLING AND SHIPPING QUALITY EGGS

Fancy eggs put up in cartons and guaranteed. A method of co-operative marketing which is proving very beneficial to poultrymen in general.

2. The degree of temperature is also important and closely related to the first factor mentioned. The room in which the incubator is to be operated should be held at about sixty degrees F., never going above sixty-five degrees nor below fifty-five degrees. The mark of sixty degrees is selected mainly because this is the temperature which is easiest to maintain evenly throughout day and night, after allowing for thorough ventilation and for outside variations in temperature between day and night, especially early in the incubating season. It is also the temperature which should surround the eggs as they are turned and cooled day after day. If the room is too cool the eggs will become too suddenly cooled and chilled, and if the room is too warm the eggs will not have a chance to cool sufficiently in the length of time allowed to remain out of the incubator.

3. The ventilation of the room is one of the most essential features which should be carefully looked into before the machine is started. There must be a constant supply of fresh air in the incubator room, because the eggs in developing need a constant supply of fresh air, and in the large number of developing embryos in each machine require a much larger supply of fresh air than is often appreciated. The gases given off during incubation must be removed and supplanted by fresh air. Every incubator has some arrangement whereby fresh air requires the airing or cooling at all times. Also every machine requires the airing or cooling of eggs at regular periods during the hatch. The purpose of this is to bring the eggs in contact with the fresh air. Never allow an incubator room to become stagnant or filled with stale or disagreeable odors. The system of ventilation should be so managed that no drafts of wind blow across the room and strike the machine in operation. There are several serious effects of drafts. In the first place, drafts interfere with the even burning of the lamp, causing the flame to flicker and often to smoke. This not only results in a variation in the temperature of the incubator, but fills the lamp and compartment with soot taking away from its efficiency and making it a dirty mess to handle. There is also a serious risk of fire resulting from a flame that is kept flickering due to drafts of air in the room. Particular attention should be given to this point when there is a prevalence of strong winds out of doors. Avoid opening windows that are directly opposite in the room, particularly if the incubator is in line between them. It is

easy to get fresh air into any room without creating drafts, and this should be the object of the man operating the machine.

4. The possibility of providing moisture during the hatch without making the room damp and cold is another factor of importance. We are coming more and more to believe that moisture is necessary to the satisfactory hatching of eggs, and therefore it becomes necessary to provide moisture in the incubator itself or in the room in which the machine is being run. The air passing over the eggs in incubation should be moist, not dry. The mother hen goes off her nest during the morning and moistens her feathers which keeps the eggs moist during the rest of the day. We must imitate nature again. It is so in all the steps of the poultry business, especially in the artificial hatching and producing of chicks. In some rooms this moisture can be supplied by the nature of the floor, and in others by the supplying of water pans, or sand pans which are kept moist. The room should not be kept so damp and dark, however, as to give it a musty, deadened odor. The air should be fresh and at the same time moistened.

5. The room should be quiet. The main object of this is to insure the machines never being jolted or moved. A machine is set up and regulated for a certain position, and will not continue to operate accurately if jarred from that position. The incubator should not be located in a place that is a main thoroughfare, as it were, where there will be danger of its being interfered with or moved. The incubator wants to be kept under the same conditions day after day.

When Operated in a Room

When only one or two incubators are to be run during the season it is scarcely practicable to build or construct a special incubator cellar for that purpose, therefore the question arises as to what kind of room or place about the premises will be suitable for the operation of the incubator. Preferably they should be placed in some room of the dwelling house, partly because such rooms are more apt to be better constructed and more adaptable for such a purpose and partly because the incubators should receive the attention of the person in charge from time to time during the day and night and should be convenient. An incubator can be operated in any living room of the house in so long as that

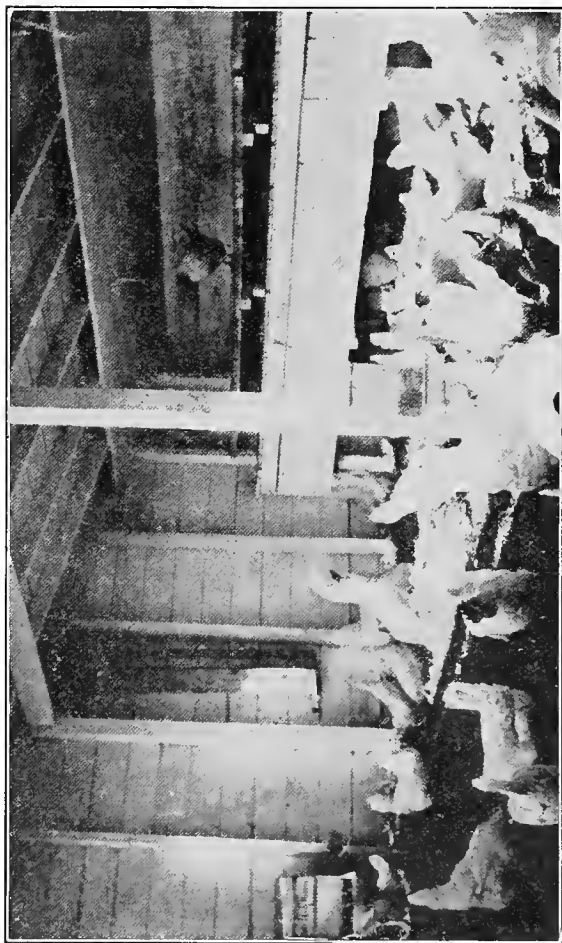
room can be kept under the conditions outlined above. A room with north windows instead of south is usually apt to be more uniform in temperature day and night, because the southern windows absorb much heat from the sun during the day and lose this at night. Of course, much can be done with artificial heat in a room of the dwelling house toward keeping the temperature uniform. One of the lesser used rooms, possibly a bedroom, should be selected, if possible. Preferably the incubator should be placed in a room in the cellar, if conditions will permit. They will be out of the way down there and probably be located in a place that is more nearly uniform day and night. Care should be taken that the cellar room is well ventilated and not damp and stagnant. A dirt floor cellar is good, as it helps to solve the moisture problem. Wherever in a house the incubator is located care must be taken to avoid any possibilities of fire.

The Incubator Cellar

With the larger poultry plants where several incubators are used or the large types are operated it becomes sooner or later necessary for the poultryman to build an incubator cellar. There are several things to bear in mind when contemplating such a building. One must plan to construct a building that will be particularly suited or adapted to the purpose for which it is built. It must include all the qualities which have been described.

Locate the incubator cellar conveniently to the brooder house. Oftentimes the incubator cellar is constructed beneath the brooder house or alongside of it. The chicks are to be transferred from the incubator cellar to the brooder house and therefore this distance should be short. As it is best to have at least half of the incubator cellar below the surface of the ground plan to build the house, if possible, where the excavation will be cut down to a minimum. Such a place is on a hillside. On many farms this will fit in with the other factors very well. Lastly, locate the incubator cellar where it will be protected from the prevailing winds of winter, if possible. Back of other outbuildings or behind rows of evergreens or other trees often solves this problems. Try in location to make the maintaining of uniform temperatures within the cellar as simple as possible.

Plan to dig enough so that at least one-half of the cellar wall



THE LAYERS AT WORK

Plenty of sunlight in the Winter quarters is second only to cleanliness. Keeping up vigor by keeping the fowls working is the best way to the full Winter egg baskets.

will be beneath the surface level of the ground. This helps to insure more uniformity in temperature between day and night. Construct the walls of the building solidly and thick so as to further insulate against changes in temperature. Very good incubator cellars can be made of hollow tile, stuccoed with cement. Cement bricks, or even cement walls alone are often used. If wooden structures are built make them solid and fully protected against heavy winds. Double boarding together with the use of building paper is necessary.

Have enough windows in the cellar to allow of admission of sufficient light to operate the machine properly but it is not important to have a light sunny cellar, as machines can be run just as well in the dark as in the light. The main object of placing windows properly in the incubator cellar is to insure proper ventilation. There are no better types of windows for use in an incubator cellar than the double sashes. Because of the half-buried walls of the cellar small sized windows are to be used in the majority of cases. Hinge one on the outside of the sill swinging from the top and opening outwards. Hinge the other from the inside, swinging from the bottom. This system will allow of having an air space of about six inches, depending upon the thickness of the walls, between the glass windows. By opening one side at the bottom and the other at the top ventilation can be secured without danger of drafts.

The size of the cellar will depend upon the number of incubators to be operated. Plans should be made also for intended additions to the incubator equipment. The inside height should allow sufficient head room for easy working, from seven to eight feet being plenty to allow. It is well to plan in one end of the cellar to build a candling room, a small room large enough for a table and chair for the person doing the candling. If several persons will do candling make the room large enough for convenience and so as to avoid the accidents which will result from crowded equipment. If there is no other convenient place in which to store hatching eggs, make shelves along the side walls of this candling room, on which can be spread out the eggs which will be used in the machines. A simple room of this kind will be of great convenience in every incubator cellar. On the outside wall of this room, which can be partitioned off with three-quarter-inch lum-

ber, make a work table on which a cover of tin is securely fastened. Use this table for the filling and trimming of all lamps and other repairs which are to be made from time to time in the cellar. The tin will lessen the danger from fire. On this table should be kept all the tools and the kerosene cans and other implements.

The floor of the cellar can be constructed of several materials. Most people prefer the natural dirt floor, as it can be easily kept moist during the spring hatches. If cement floors are used they must be kept moist as hatching time progresses. The dirt floor is cheapest and from most standpoints the most satisfactory, if the building is so located that the land drainage is not emptying into the cellar, causing the accumulation of a surplus of moisture that is undesirable. A good plan is to build either cement or wooden walks in the cellar, leaving dirt bottoms on which the incubators will stand.

Make the whole interior as simple and straight as possible. This will aid in keeping the place sanitary and will cheapen the cost of construction.

Managing the Incubator Celler

There are a few certain rules which should be adopted for use in any room in which an artificial incubator is being operated.

1. Keep the room thoroughly ventilated, but without drafts.
2. Arrange the incubators conveniently, particularly with regard to the lamps.
3. Never carry lighted lamps, cigars, or cigarettes into the cellar.
4. Practice a regular routine in caring for the incubators.
5. Be sure all incubators, particularly the lamps, are in good condition before leaving the cellar at any time.
6. Care for lamps and stoves regularly and carefully.
7. Avoid commotion of any kind in the incubator cellar.
8. Keep everything picked up and neat and in its place.
9. Keep accurate records of all machines posted in some convenient and conspicuous place in the cellar.

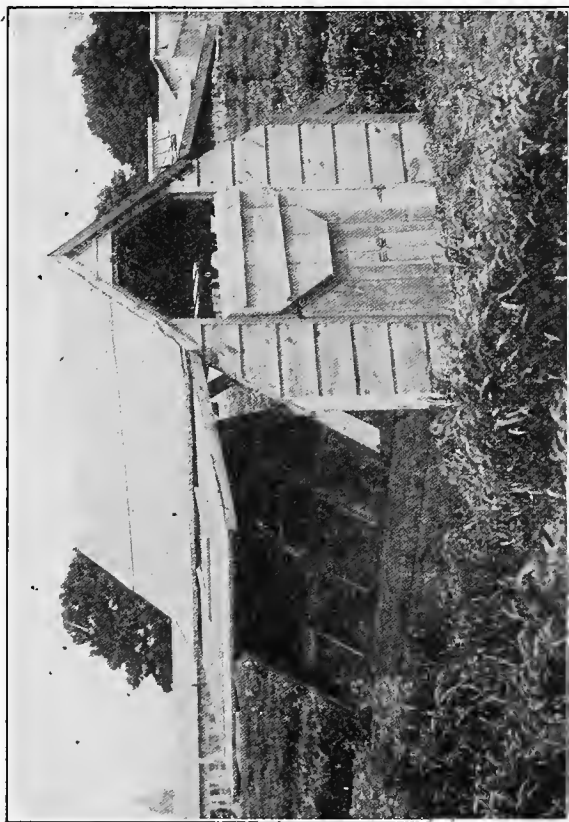
CHAPTER VII.

VALUE OF STRAIN.

By T. F. McGREW.

The value of strain depends entirely upon its ability to perpetuate its qualities in its offspring. The meaning of this is found in the words of the Standard, which tells us that a "strain" is a family of any variety of fowls bred in line by descent by one fancier, or a successor, during a number of years; that has acquired individual characteristics which distinguish it more or less from other strains or specimens of the same variety. In other words, a strain of fowls must be bred in line from a common ancestor: They must be so bred by an individual or his successor, for a number of years, or until strain, character (distinctive qualities) have been so well established as to be noticeable. Under this meaning they cease to be a strain whenever they are distributed among others who breed them less carefully or as soon as they lose their individuality of character.

This will make plain, we hope, the fact that it is the careful breeding that makes the strain and not the mere claim of its existence. It is quite amusing to see in print the claim of a strain by those who have been known to the fancy for a few years—it is quite as misleading to read in advertisements that a mere amateur can furnish eggs for hatching a show winner, from some well established strain, none of which can be true in the strict sense of "Standard law." There are in fact but few well established strains in all America. While this should not be so, it is far too true, and much to be regretted. Among the last letters received from the late Harry Pickles, of England, he wrote: "I have a pen of Hamburgs that have been together for over twenty-five years. When the male is removed his own best son takes his place—if a female, her own best daughter takes her place." Thus did he breed them for twenty-five years and they were better, larger, stronger and more vigorous than at the start. This may be called "ideal" line breeding.



FRESH AIR BREEDING AND GROWING HOUSE

Fresh air in abundance aids in keeping the chicks growing continuously. This combination breeding and growing house has met with unusual favor.

In the making of a strain, whether for show qualities, for egg production or for market poultry, or for all three combined; one must have knowledge of their requirements. It is quite necessary to understand first of all the full meaning of the Standard description of the breed and the variety you select. You must learn the necessity for health and vigor in the fowls selected for foundation stock. No fowls that lack vigor can lay well, nor will they make or produce the best table poultry.

For Breeding Layers

Whether the hen was before the egg or the egg before the hen need not be considered when selecting the breeders. If our first thought or wish is for large egg production, we should "select and keep only the best fowls for breeders" selected for vigor and egg production. If all who keep poultry would follow this rule, there would be but little disease and lack of vitality; unhatchable eggs and weakling chicks would quickly disappear.

No eggs should be used to hatch, save those laid by the best and strongest members of the flock. Fowls showing even the slightest tendency toward weakness should never be used as breeders.

Hens and pullets not intended for use as breeders should be kept apart and without males. Those meant to be used for breeding purposes should be confined within enclosures during the time their eggs are being saved to hatch from. The males mated with them should invariably be sons of vigorous hens that have been bred in line from stock that have produced offspring that grade up or near to what you desire to have.

Eggs from strong hens so kept and mated should nearly all hatch, and ninety per cent. of the chicks should live and grow to maturity. Selection for vigor should begin with the hatching of the chicks. The most vigorous of the chicks should be toe-marked and watched constantly until full grown. The best of them should then be selected as breeding stock. The result of such a course will be marked improvement in size, vigor, strength, and egg-producing power. When selecting for breeders keep in mind the type of fowl most desirable. Give preference to neither the largest nor the smallest, but to the best proportioned hens of

medium size. Be sure that they possess the very qualities you wish to develop in your flock.

The best time to begin culling for breeders is when the hens and pullets are being arranged in separate flocks for the winter. At this time all the weaker fowls, as well as those improperly formed, should be put into a flock by themselves. Into the breeding flocks should go only such fowls as the poultryman considers a fair sample of what he would like to produce in years to come. Day in and day out watch should be kept, so that hens showing any tendency toward weakness may be culled and not used as breeders.

So far as possible the cockerels mated with breeding hens should be the sons of the champion layer of the flock. And it will be well if the champion herself be mated with a cockerel whose sire showed ability to produce pullets of high egg capacity. The most successful poultrymen are those who know not only what hens lay a satisfactory number of eggs, but what matings produce pullets that do likewise. In order to be sure of this, it is necessary to keep close watch upon the males.

To little attention has been given to the selection of hens for use as layers of hatching eggs, and less attention still has been devoted to the selection of males.

Those breeding Plymouth Rocks, for instance, should use only females with long bodies, large, full, oval breasts, and abdomens of like character. The hens should be evenly poised on the shanks, that is, quite as much body and breast should be in front of the thighs as there is of body and abdomen behind. Above all, there should be great width between the thighs to permit of widening out of the breast bone. Without this there will not be room in the internal organs to allow the full development of eggs. —

If hens of the proper type and development be mated with males of the same kind, the offspring will almost certainly be of a kind to make the poultryman glad.

Laying Strains

For five or six years experiments have been going on in England, Australia and the United States to determine why some strains of hens lay so much better than others, and why certain

hens of recognized laying strains yield many more eggs than other hens of the same strains.

The first real attempt to solve the problem was made in Australia, where egg-laying competitions have been conducted regularly for twelve years. It has been found there that the Mediterranean, the American, and the Langshan are probably the breeds from which the best layers have come.

Silver Laced Wyandottes were the first to attract attention as prolific egg producers; following them, Rose Comb Brown Leghorns appeared to do best; then the White Leghorn developed remarkable laying capacity, as did also the Langshans and a few Orpingtons.

The records made in the earlier Australian contests stimulated interest. It was quickly demonstrated that some breeds of hens are naturally better layers than others. At present it appears to be settled that carefully selected hens from the most carefully bred strains of American and Mediterranean fowls are the best layers.

More than twelve years ago John Wharton came from Warwick, England, to secure some of the new varieties of Partridge and Silver Penciled Wyandottes. He took back with him a few selected hens and pullets, one of which made so wonderful a record in egg production as to attract attention. For fifteen months she laid continually. Since that time several laying strains of Wyandottes have been bred. Some of the Whites did remarkably well in recent egg-laying contests.

Strength and Vigor

The dictionary tells us that vigor is "active strength or force" and that environment refers to one's surroundings. Environment will not create health or vigor, but proper environment will sustain and protect and improve health and vigor. The only certainty we have of combined good health for our poultry comes with proper environment for them to live in.

Vigor, or as the dictionary says, active strength or force, is a constitutional belonging that may be lost for lack of proper environment and which will be improved as the result of surroundings which are both sanitary and helpful. There is no other kind of animal life so easily influenced with its environment as



The corn field is a most satisfactory range for poultry, both young and old.

are the feathered tribes. Birds and fowl of all kinds are susceptible to both weather and sanitary conditions. In this instance conditions refer to their surroundings. All birds, including fowls of every variety have their natural habitation out in the open among the trees and the bushes. From the survival of the fittest, the strongest and most healthy endured, and continued to live and come together in the spring to do their part in the reproduction of their kind. The migratory birds are culled and kept vigorous by the terrible strain of long flights, from their northern and southern abodes, to come back again with the return of spring.

Fowls that live now out in the open, that roost in trees and that are reasonably free from insect vermin, keep healthy, with their plumage always in the best of condition; colds and roup are almost entirely unknown to them. The same was true to a large degree with the fowls that roosted formerly in the old wagon shed or other outbuildings.

With domestication came the need for more eggs, for more control of the fowls; houses were built for their accommodation and many were compelled and are yet compelled to live and roost in places that are not healthy for them. Many of them live in surroundings most unsanitary, in places where vermin and filth abound and where dampness is continuous throughout the winter months. Such environment is destructive to health, strength and vigor, which when lost makes the fowl unfit for breeding purposes.

When strength and vigor are gone, there will remain neither egg producing power nor the power of reproduction. One of the surest evidences of strength and vigor in a fowl is its sturdy appearance and determined movement. Usually such fowls have bright red eyes that stand out prominently, flashing with the fire of health. The first symptoms of decay are shown in a heavy uncertain motion and a dullness of the eye.

One of the most valuable assets to a breeding pen is a male that is so vigorous that he shows fight each time the attendant goes where he is. Such males should never be abused or mistreated. All their vigor should be matured into beneficial results. Whenever an attendant kicks or abuses a male of such sturdy vigor he is destroying one of the most valuable assets of his flock.

The Value of Feeding

Breeding has by far more influences for success than feeding; yet no other phase of poultry culture has had equal consideration with feeding. The greater part of all efforts expended by agricultural colleges and experiment stations has been directed along the line of feeding. So little has been said or done by them to improve breeding as to scarcely attract attention. The majority of those who keep poultry imagine that all depends upon the rations fed. While it is necessary that all fowls shall be well fed and properly fed, it is far more essential that the fowls be both well and properly bred and possessed of vigor. No matter how well selected the ration may be it will not make hens lay well that are lacking in vitality.

One of the greatest drawbacks to the poultry fancy of today is the uncertainty of the "hatchability" of eggs. They show fertility, but so weak as to lack strength sufficient to get out of the shell alive and to grow to maturity. This is lack of vitality in the egg or the embryo chicks or both. The egg may have vitality and strength of albumen, and the germ from the male may be so weak as to loose life before it has grown to completion. If the egg is strong in vitality and the germ that passes from the male to the germ cell is full of vigor the egg should hatch and the chick should live. If either or both are lacking the egg will not produce a chick. Lack of hatchability is simply lack of vitality, a poor hatch whether naturally made or artificially, results usually from lack of vitality in the eggs. Trouble of this kind cannot be improved by feeding.

Proper Breeding

Proper breeding should have first consideration at all times with those who keep poultry. Above all things make sure that the eggs used for hatching have been laid by mature hens that possess the greatest amount of strength and vigor. Never risk the possibility of varying vitality through a desire to have quantity instead of quality. Fifty strong healthy hens that are full of health and vigor will be more valuable and more profitable than three times as many if lacking in these essentials.

Vitality seems to be but little understood and it is difficult to explain to those who do not understand it. It is often quite

difficult to understand why poultrymen are continually changing from one variety to another, or mixing several varieties. It seems strange that it should not occur to them that one road to success leads through a careful selection of a single variety and the continuous breeding of them for improvement. With the very best of care it will take at least five years to bring a flock to even reasonable quality. Many seem surprised at this, yet the most disturbing and the most prevalent annoyance to poultrymen today is that so few succeed and so many fail.

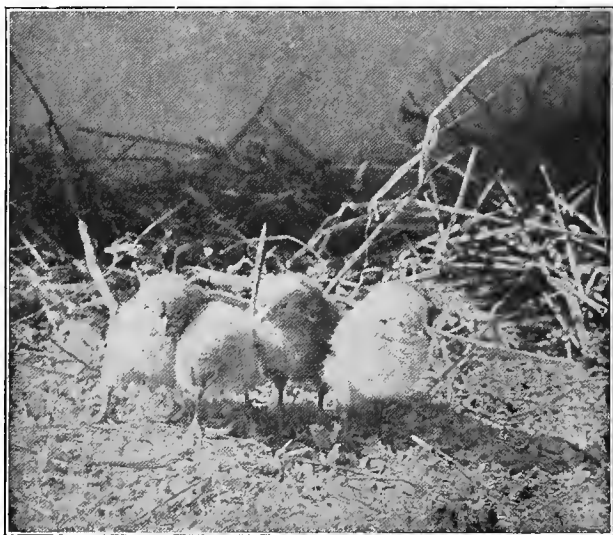
Troubles With Flock

I presume that there are no other questions so frequently asked as the queries, "Why don't the eggs hatch?" "Why do so many of the chicks die in the shell?" "Why is it that so few grow to maturity?" The one answer to all of these is "Lack of vitality." This coupled with improper environment are the reasons for failure in more instances, perhaps, than all other reasons combined.

There does not seem to be any questioning the statement that infertile, weak germs and poor hatches, can all be traced to lack of vitality in the stock that produces the eggs. We do not believe that any of us would willingly admit that the eggs we put in the incubators or under hens, or which we sent to others from our stock, did not hatch because of lack of vitality. Yet, we might be willing to admit perhaps that that was the trouble in other localities.

We know that full feathered fowls, such as Cochins, some strains of Brahmas, some Orpingtons, especially the black variety, failed because of obstruction by feather formation. We also know that eggs of other breeds and varieties from some flocks will hatch a large per cent. of sturdy chicks, while eggs from other flocks of the same breeds and varieties kept in the same neighborhood will scarcely hatch at all. An acquaintance has seven chicks from one hundred eggs placed in an incubator. His next door neighbor has twelve chicks from fifteen eggs laid by the same hens, hatched under a hen and brooded by her. Another, whose hens have a free run of the fields and a lumber yard gets many eggs from the hens some of which have been hatched by hens coming out in nineteen and twenty days. These chicks all of them live

and grow to maturity. Why did twelve chicks from fifteen eggs hatched by one hen and only seven chicks from one hundred eggs from the same hen, placed in an incubator. The trouble was, of course, lack of vitality and improper handling of the incubator. The hen, used to her calling cared for the eggs in a natural way and nursed the germs into the chicks. The other eggs laid by hens so full of vitality and vigor that the chicks grow fast in the



Four little "huskies" basking in the sunshine.

shell, popped out upon the twentieth day and they are full of vigor you could scarcely kill them with a club.

From all this we should gather the information that teaches the value of vigor above all other qualities. No one can hope to establish a strain of fowls that will endure the stress of continued line breeding, unless they include "vim, vigor and vitality as the corner-stone, the foundation and the watchword of their up-building."

CHAPTER VIII.

PARASITIC ENEMIES OF THE GROWING CHICKS.

By WILLARD C. THOMPSON.

It is the common experience of nearly all poultry raisers that the birds that finally become the best producers and biggest wage-earners in his flocks are those that, during their first summer, developed quickly and continuously, without going through stunted periods of growth, when the normal activities and health of the chicks were impaired. One of the objects of supreme importance in raising chicks through the summer season is to encourage steady, continuous development, a little added size and growth for each day. This is the one way in which normal, healthy strong birds can be obtained for the future flocks. Only those that make such unrestricted growth will be fitted with bodies that produce eggs economically, and, if used as breeders, will produce chicks that are strong and liveable. The summer season is the period of growth, and should be aided in any way in which poultrymen can assist nature. Of course, in this plan to promote the best development possible would be included the selection of ranges which are roomy, supplied with green food, fresh soil, and water supply for the hot days, the mixing of proper rations, the feeding methods employed, and a large number of other factors, but in addition to these extremely essential aids there is one that should deserve especial attention at the opening of the summer season, mainly because it is a preventative of future troubles. This is the systematic management and planning to avoid infestations of lice, mites and other parasites that pester growing chicks, drawing heavily upon the vitality and strength of those chicks..

A parasite is a living thing which gains its living from another living thing. Thus the many insects and worms that sometimes bother poultry are properly parasitic enemies, for they all live either in or upon the bodies of the birds, at least for a part of the time, and suck blood or otherwise deplete the vitality of the victims. During the hot summer months these parasitic enemies

multiply abundantly and cause great losses where premises are allowed to become so carelessly managed as to increase the possibilities of their existence in immense numbers. The presence and prevalence of insect and worm pests in the poultry yards and houses during the summer, or in fact during any time of the year, is largely governed by the way in which the places are cared for from a sanitary standpoint. Cleanliness and neatness about the poultry plant are enemies of parasitic enemies and on the well-kept, sanitary poultry farm there need be little danger of losses from parasitic infestation. All these small enemies grow and thrive in filthy environment and in out-of-the-way places that are not often visited or watched.

Before discussing any of these parasites in detail it should be realized by all that general methods of sanitation employed about the poultry plant will be a preventative of serious infestations. In these days of general preparedness in all lines of effort it should be comparatively easy to remember that a few extra steps taken to keep things clean and picked up will prevent future troubles. Houses that have cobweb-covered roof rafters are usually those that are most apt to harbor the insect enemies that will harm the birds in those houses. The Spring cleaning of the poultry houses should remove all such places that are excellent homes for vermin, and disease germs. Old musty litter, accumulations of manure in manure pits beneath roosts, and such like undesirable surroundings should be carefully avoided. The colony houses that are to be the summer homes of the growing chicks should be thoroughly swept and disinfected at the beginning of the season. These are all preventive measures.

External Parasites

For convenience sake, we may divide those parasites that trouble growing chicks in Summer into two classes, those first, that live upon the exterior surface of the body, and gnaw at the feathers, skin, or other external parts, or suck blood through piercing the skin. In this class is to be found the worst and most dangerous kind of enemies. Probably there is no one parasitic enemy of the chick on range that is annually demanding and taking greater toll from our poultry flocks than the rather innocent looking little red mite. The red mite derives its name from the appearance of the mite after having had its meal of blood, until its body is so



POULTRY HOUSE CLEANING

Spraying the interior of the house with a complete disinfecting solution which leaves it sweet, clean and white. Cleanliness assures best results and remember that it is much easier to prevent disease than to cure it.

engorged with blood as to make it red in color. When empty it is rather yellowish in color. The red mite is a tiny, blood-sucking insect that is furnished with mouth parts that resemble long tubes. These sucking mouth pieces penetrate the skin and enter the small blood vessels, drawing a small amount of blood. This not only seriously depletes the blood supply, but the wound causes irritation and itching, which in turn, causes unrest. Each tends to lower the vitality of the fowls affected to a very marked degree. When a red mite infestation gets a foot-hold in a poultry house of any kind the insects multiply in immense numbers and very rapidly, so that the danger becomes alarmingly great in a comparatively short time. The red mite is a "night worker," doing its deadly work while the fowls are on the perches or nests, crawling off from the birds' bodies and staying in the cracks and crevices of the dropping boards, nests and walls during the day time. This one fact is not appreciated by many raisers of poultry and so much damage is done by red mites even though efforts are constantly made to get rid of them. Knowing this much about the habits of the red mites gives us a clue as to how to effectively go about eliminating them. One of the best methods of practical value that is available and possible on every adult plant is the use of pure and unadulterated kerosene oil. The dropping boards and perches should be well cleaned off and swept free of manure and other litter material, then painted with the oil, an old paint brush can well be used for this purpose. Be sure that all the cracks and hidden places are covered with the kerosene. One of the most important places to get covered with kerosene is the joint or junction where the perches are put together and where the perch supports rest on the dropping boards. The red mites will not be found out in the open but in these little hiding places. Do this work after feeding in the morning, so that the kerosene will be absorbed and the excess evaporated by the time that the birds are ready to use those parts of the houses again. In the Summer range houses especial attention should be given to the red mite proposition as these insects are often the cause of mortality among growing chicks, making them grow "light in weight," lose flesh and appear sickly and weak. Neglected colony houses are apt to harbor infestations of red mites while well cared for and sanitary houses are safe places for growing chicks, in so far as the danger from these pests are concerned, at least. There are several

good paints on the market which are recommended for the eradication of red mites, many of which are effective. Most of them have a sort of wax consistency which means that they remain effective for a long period of time. Look in the advertising pages of the dependable poultry publications for the names and addresses of manufacturers and then write for samples and try them. It certainly pays to be "prepared" against red mites. Remember always that these insect enemies not only cause considerable losses on their own account, but they so weaken and lower the vitality of the chicks that they cannot grow properly and continuously.

Next to the red mite the body louse is probably one of the worst parasitic enemies that the chick has to battle against during the Summer on many plants. There is a possible chance of body lice affecting chicks in two different ways, depending upon the method of rearing chicks that is employed. In the first place chicks that are raised under the mother hens are apt to be affected by the lice during their first few weeks, and then the mortality rate jumps up by leaps and bounds, as the baby chicks are not well enough developed to withstand the effects of the lice. The best way to avoid lice on baby chicks brooded under hens is to do two distinct preventive things, first rid the hen of any lice infestation on her own body, and secondly to furnish an environment that is clean and free from previous infestation. The broody hen should be treated for lice when she is transferred to the sitting coop before the eggs are given to her. This may be done by powdering her well with some good, fine, dry louse powder, many of which are on the market, or by the use and application of ointments and commercial louse eradicators. Personally, I prefer to use the ointment for such cases, as a little rubbed in the immediate region of the vent is all that is necessary and it is not necessary to get the feathers, which are to cover the eggs, all filled with carbolic fumes, tobacco smells, etc. The application should be made again at about the end of the second week of incubation, in order to get rid of any lice that might have hatched out of eggs. The mother hen ought then to be free from lice when the eggs hatch. Her nest should be clean and fresh before each setting, so that old litter will not furnish the source of lice. Clean surroundings will not be apt to be infested with lice. But lice may and some-

times do cause very serious damage to artificially brooded chicks. In such instances the trouble may start in the brooder houses, but more usually it is taken up on the ranges after the chicks have



Keep the dropping boards clean, always.

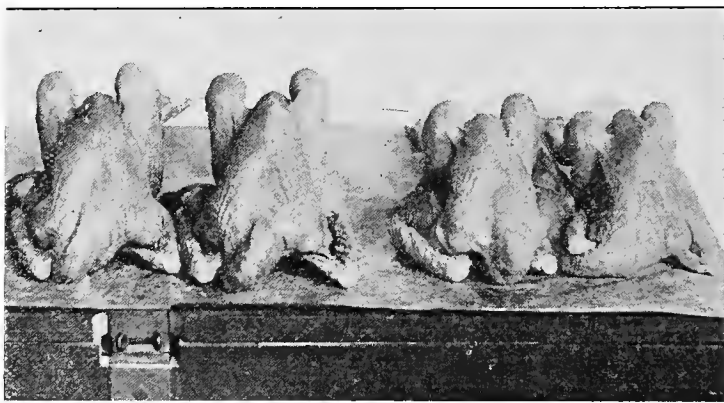
been moved to the colony houses, which were not cleaned out at the close of the previous season. Old musty litter, accumulations of manure, etc., are excellent homes for lice to Winter over in.

The colony houses should be left clean in the Fall and then thoroughly cleaned before the new season's chicks are again transferred to them. If such precautions are taken little attention need be given to the lice problem on growing chicks. Body lice go at their destructive work in a very different way than do the red mites. They are biting insects and chew at the base of the feathers and on the skin until they cause raw sores, torn and ragged plumage, and cause serious loss of sleep and rest.

The "depluming mite" is sometimes active on nearly grown chicks and old fowls during the summer. It is similar to the red mite in size and appearance, but it burrows into the base of the feathers, especially of the neck, destroying the roots of the feathers and the loss of the feathers affected. The result is that many birds become entirely bare near the head and on the neck. The feathers so removed are not replaced until after a long period as the roots are destroyed. An ointment made of about ten parts of lard or vaseline, by volume, and one part of any good coal-tar dip, well mixed together is very effective in destroying this mite. Each bird must be handled individually and the ointment rubbed onto the entire surface affected. It will take several weeks for the feathers to be replaced, so do not expect results to show immediately.

Gape worms are probably the most serious pest of many poultry sections, and I say sections because there appear to be certain sections of the country that have become infested with these gape worms, while others are as yet practically free from them. Gape worms are really internal worms, clinging to the walls of the trachea, or wind-pipe, accumulating there in sufficient numbers to clog up the breathing space and thus kill their victims. They also suck much blood from the walls to which they tenaciously cling. They appear to be forked shaped because the male and female are always grown together to form this forked appearance. They are especially apt to cause heavy losses among the younger chicks and are not so common on matured birds. The chicks which are affected gradually grow weaker and cough and struggle for breath, which becomes more and more difficult as the worms increase in number. The worms live over from year to year in the yards, living a part of their existence in earth worms, which are picked up by the next year's flocks. The only advice that seems particu-

larly practical has to do almost entirely with preventive measures, as it is very difficult to administer medicine to the affected chicks, and especially when it is needed down the wind-pipe. In the first place if trouble from this source has been noticeable the previous year new ground should be selected over which to allow the chicks to range, if this is possible. The old yards should be heavily limed with air-slaked builders' lime and plowed deep. The brooder houses should be thoroughly cleaned and disinfected at the beginning of the season. The small runs usually used outside the brooder houses can be heavily sprinkled with a one per cent. disinfectant solution, then the surface soil turned under deeply.



Large, medium and small broilers which have been well finished and which will bring the grower a handsome return.

In some cases it is undoubtedly wise to go out of the chick raising game for a season or two, purchasing nearly matured pullets from non-infected farms. Constant vigilance and good planning will get rid of the serious trouble, but medicines and mechanical appliances for the removal of the worms from the throats will do but little, in my opinion, toward relieving the situation. The removers are apt to injure the delicate parts of the throat and their use requires altogether too much time and patience to be practical on a large scale. Try always to prevent the trouble.

CHAPTER IX.

EFFICIENCY IN POULTRY PRODUCTION.

By H. R. LEWIS.

With feed prices so high, labor scarce and the demand for food materials for human consumption always more insistent, it behooves the poultry keeper, in meeting the present emergency, to practice every possible economy in his methods of management. A greater efficiency in poultry production will probably result more advantageously to this country as a whole than any consistent effort to produce extremely large quantities of products without due attention to the cost of production. We all know that laying hens in the late Summer and Fall gradually cease to produce, the less productive birds stopping some time in July and early August. It is safe to say, however, that in September a very rigid and final selection of yearling hens can be made to determine those which are then in profitable producing condition and to select those which shall be held over next year to be used for breeding purposes. The elimination of the non-producers at this time will greatly reduce the food requirements of the flock without, in any way, decreasing the revenue from eggs produced.

Much has been said about the method of selecting birds and methods of culling barren birds from the laying stock. The trap-nest has been and is used extensively, but with large commercial flocks the labor involved becomes extremely expensive and is a question whether the results secured warrant this expenditure. On the other hand, however, any method which will enable the poultryman to separate the producing from the non-uproducing birds on the basis of external appearance is well worthy of a trial. Especially would this method be desirable if the percentage of the error in selection were reduced to a very low point.

It is the purpose of this chapter to discuss only briefly the application of the color pigment test to the culling practice. All students of poultry have noticed, and, in Leghorns especially, that

there are certain sections of the body, such as ear lobes, beak, and shank, which in the maturing pullet, are bright yellow in color. This is due to a color pigment, which is maintained in these sections from the food which the bird consumes.

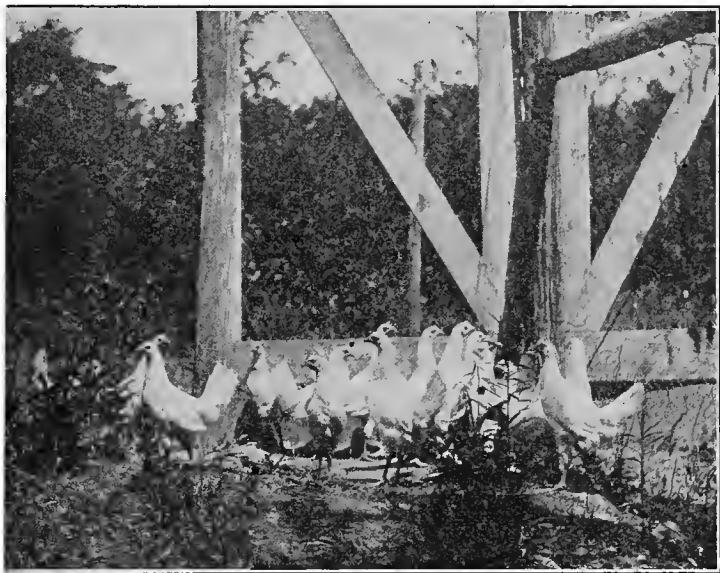
It is found that the yolk of eggs contains the same kind of yellow pigment in large quantities. Members of the poultry department of the Connecticut Agricultural College were among the first to observe the relation which apparently exists between the yellow pigment in the ear lobes, beak and shank of the birds to the production of a varying number of eggs. The relation is this. As birds begin to lay heavily the requirements for yellow pigment in the manufacture of the yolks becomes extremely heavy, so much so that the birds use all the pigment material for yolks, with the result that the ear lobes, beak, and shank fade out on account of the absence of newly formed pigment in these sections. It was later observed that the color of the vent of the hens also followed the same relation in reference to coloration in producing and non-producing periods. This pigment test has been carefully analyzed and studied when applied to the birds at the International Egg Laying and Breeding Contest at Vineland. Also, it has been used as a basis of selection at the New Jersey Experiment Station poultry farm, at New Brunswick, for the past two years. The results have been extremely successful and the method is highly recommended for commercial application.

Professors Warner and Blakely, of the Storr's Experiment Station should receive special commendation at the hands of the poultry fraternity for the early discovery of this relation of pigmentation to egg production.

Application of the Test

In applying the pigment test in culling non-producing birds from any flock, it is first essential to appreciate the fact that upon starting to lay heavily the color in the various sections of pullets disappear in a certain definite order, one section with another. For instance, the yellow pigment disappears from around the vent, first, usually after the pullet has laid from five to ten eggs. Secondly, the ear lobes become bleached out and free from any coloration. It usually requires about a month to attain this condition. The beak color next disappears, the extreme point of the

beak becoming pigment free sooner than the base of the beak, and lastly, after from three to five month's production, if the lay has been heavy, the shanks will become almost white. In many specimens no yellow pigment whatsoever is apparent. The application of the absence of pigment test to protect poor producers in the fall is based on the fact that the color pigment reappears in



Strong and well developed stock is a first requisite for poultry results. Breeding from vigorous stock and growing them right will give both results and satisfaction.

these sections upon the birds ceasing to produce in exactly the same order, namely, within a week or ten days after the laying period has passed. The vent will take on a yellow color, which becomes more pronounced as the resting period is prolonged. The color next appears in the ear lobes, later in the beak, and finally returns to the shanks.

In applying this test commercially, the plan should be to handle in daylight each bird in the flock which is being culled. Eliminate

and market immediately in early September any hens which show deep yellow color around the vent and which show deep yellow ear lobes, beak and shank. Hens which, at this time, show white shanks, white beak, and white ear lobes, and especially white vent, are without doubt remarkably high producers, as the absence of pigment will show that they have been laying heavily and the white vent would indicate that they were then in good laying condition. This type of bird should be the one finally selected for holding over a second year.

When using the pigment test it would not do to eliminate certain other characters in making the final determination regarding which birds it would be best to keep. Any birds, regardless of the pigment condition, which show evidences of sickness or low vitality should not be considered suitable for a second year's production or for breeding. The weight of the bird and the condition with reference to the moult should also receive due consideration.

An Instance of the Application of the Pigment Test

On September first last, five hundred yearling hens were rigidly culled on the basis of the pigment test previously discussed. The birds were laying previous to the test approximately two hundred to two hundred and twenty-five eggs daily. The pigment test was applied and two hundred and ten birds eliminated, leaving two hundred and ninety in the flock. During the days immediately following the egg production remained at the approximate amount which had been maintained for a few weeks previous to the culling, the results of commercial selection in this way and at this time means a greater reduction in the feed bill, reduced labor in caring for the flock, and practically as many eggs for market.

This test can be applied to all of the Standard American breeds, the same as with Leghorns, with the exception of the ear lobe character, which can simply be eliminated and a selection made on the basis of vent color, beak and shank color.

CHAPTER X.

*** FEEDING FOR EGGS IN WINTER.**

By H. R. LEWIS.

Nutrition is one of the most vital processes of all life. It is the process by which life is maintained and growth is promoted. In the case of birds it controls the wearing away and the building up of body tissue, it converts food into heat and energy into the products that are produced outside of the body, as the egg. The process of nutrition is carried on through minute particles or materials in feeds, which are called nutrients. These nutrients are transported to the different parts of the body and after being broken down in the process of digestion go directly into the making of solids and liquids of the body. The nutrients which should be of special interest to the poultryman are five in number. A knowledge of their nature, functions and the most economical source from which to obtain them is necessary if an efficient and economical ration is to be mixed. These nutrients are: protein, fat, carbo-hydrates, ash or mineral, and water. With the exception of the carbo-hydrates these materials are all found in the body of the birds and are essential to their life and development. The following brief discussion of the nature and function of these materials will be valuable.

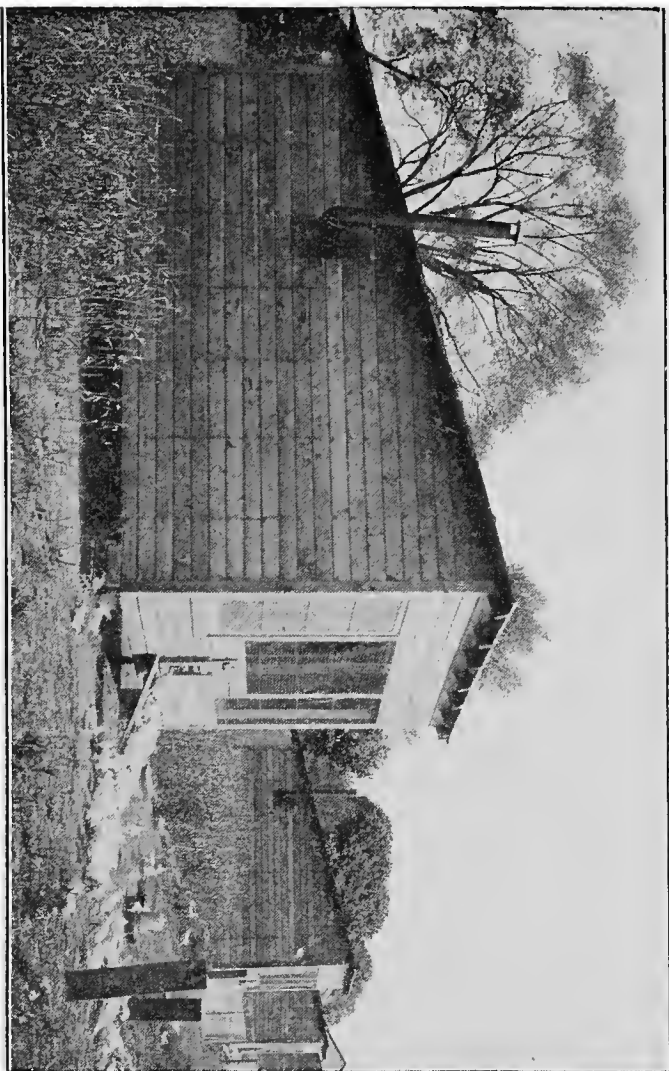
The Nature and Function of Food Nutrients

The protein nutrients are among the most important in feeding for eggs. They contain a considerably quantity of nitrogen, on which account they are rather expensive to buy and hard to raise at home. Common examples of protein compounds are the albumen or white of the egg, lean meat and gristle. The feathers contain much protein. Protein when fed to birds has three distinct functions to perform. Its most necessary use is in the production of body tissue. This is seen in the case of growing animals, as young chicks. It furnishes material for the repair and building up of waste or broken down tissue in the adult. Much protein is used in the formation of feathers, claws and other similar body

parts. The second great use for protein is in the production of some product outside of the body, as eggs. The egg is largely water, but when only its dry matter is considered one-third is protein or a nitrogenous compound. The third function of protein is that all not used, for the first two purposes is not wasted and thrown off as excreta, but it is burned in the body like carbohydrates and furnishes material for the formation of fat. Protein is indispensable in any ration for laying hens for its place cannot be taken by either of the other nutrients, hence great care should be used to see that it is supplied in abundance. A laying ration is satisfactory or not, depending upon the amount and nature of its protein.

Fat is familiar to all. It exists in the form of oil in seeds, in vegetable products and in animal tissue. Most vegetable feeds are rather low in fat content, there are a few, however, such as oil meal, cottonseed and others which are characterized by large amounts of fat. Fat, as it is found in the bird's body, acts as a reserve food supply and filling up the spaces between the organs as a cushion or protecting layer. Much fat is found under the skin where it gives the animal a plump, full appearance. It is this quality of fat which is desired in the plump broiler or roaster, which is being finished for market. The functions of fat are so similar to those of carbo-hydrates that they can be considered together.

The third group of nutrients mentioned was carbo-hydrates. This group contains the starches, sugars and fibres. Carbo-hydrates are found in abundance in all cereals and they can be produced by the poultryman in large quantities on his home farm; when purchased they can be secured at a reasonable price. This group of nutrients, together with fat, is essentially energy formers. Their functions are threefold. First, they are burned in the body during the processes of digestion and give off heat, which keeps the body warm. Secondly, the heat energy so produced is developed into energy to enable the bird to move about; lastly, all of these nutrients are so changed over that they can be stored up in the body in the form of reserve heat or fat. The only real difference between fat and the carbo-hydrates is the fact that the former is much more efficient, a smaller amount of fat giving a greater amount of energy value.



Deep shed roof colony breeding house. Many of such houses are found on our big plants today. You can provide one in your back yard.

The ash content of the body is easily appreciated in the bony framework or skeleton. Ash exists in very small quantities in other parts of the body. Ash is very essential in feeding young growing birds, as it is required in large quantities to make suitable bone development. Laying hens require quantities to make the shell of the egg. Ash is very useful in increasing the efficiency of any ration for the presence of same seems to increase the amounts of the other nutrients assimilated. Phosphoric acid and lime are the two chief kinds of ash needed, the former to make bone and increased assimilation, while the latter is used almost exclusively for shell formation.

With many poultry feeders the great need for an abundant supply of water is very frequently overlooked. Water, while not a true nutrient, is nevertheless so intimately associated with the process of nutrition that it should be considered here. Water has four definite functions to perform in the bird's body. (1) It gives the body a plump, full appearance by filling up the cells and distending the tissue. (2) It is a material aid to digestion by dissolving the particles of food material and reducing them to smaller size so that they can more readily be acted upon by the digestive fluids. (3) It is a valuable transporting agent, carrying the digested food material to all parts of the body. It is a material aid to assimilation by aiding diffusion. (4) The body temperature of the bird is relatively high, and water acts as a regulator, maintaining a uniform constant temperature. From study of these uses it is very apparent why a fresh supply of clean, pure water should be kept before the flock all of the time and also why some succulent material should be given in addition.

These nutrients constitute fuel, which is given to keep the bird's body alive and active. Just as the stove needs fuel to make it burn and give off heat so the animal's body needs fuel to keep it running. This food material, in the case of the hen, has an additional function to perform, namely, the supplying of raw material from which the egg is manufactured. The bird's body is really a machine taking in a raw or unfinished product and turning out a finished product for human food consumption in the form of meat and eggs. In order to better see what raw materials are most necessary, let us study for a moment the nature of the machine, its product and the feed which it consumes.

The Relation Between Feed and Product

In the feeding of all domestic animals there must be a close relation between the nutrients in the feed and the character or composition of the resulting product. For instance a product which contains much protein and water, as the egg, can only be produced in goodly number when the feed is rich in these ingredients. That, in a few words is the reason why the average farm flock throughout the United States produces but few eggs at any season except the natural breeding season in the Spring. The farmer has plenty of corn, which he raises at home and he feeds it to the exclusion of everything else. Corn is essentially a fat and carbo-hydrate feed and hence does not provide the protein necessary to make eggs. The following figures show the relation which exists between the composition of the feed, the bird's body and her product, eggs:

Feeds

	Water	Protein	Fat	Carbo- Hydrates	Ash
Corn	10.6	10.3	5.0	72.6	1.5
Meat Scrap	10.7	60.0	20.0		5.0
Green Clover	70.0	5.0	1.0	20.0	2.0

Bird's Body

Hen	55.0	20.0	19.0		4.0
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Her Product

Fresh Egg	66.0	13.0	9.0		12.0
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Eggs, which are the product desired, contain much water, by the figures over two-thirds of a dozen eggs are water. Green clover, or any other palatable green feed, would then be selected to make up a part of her diet. Taking out the water from eggs the remaining portion would be about one-third protein and one-third ash, with a smaller amount of fat. To supply these materials one would naturally select meat scrap for it is high in both protein and fat and the protein is especially palatable and easily digested. This comparison shows the necessity of feeding layers much mineral feed. Ground oyster shell contains a high percentage of lime and is largely used for making the shell of the egg. Phosphoric acid can best be secured from bone products. Dry ground bone contains about 25 per cent. of protein and in addition over 20 per cent. of phosphoric acid, the presence of which is

a great benefit to the ration. Fish scrap, if of good quality, can be economically used as it contains much protein and valuable bone products including phosphoric acid. From the above figures it will be seen that corn, like most other cereal crops, can be used to provide the carbo-hydrate or heat-forming nutrients. The bird's body is similar in many respects in composition to the egg, there being over 50 per cent. of water present, much protein and considerable fat. The maintenance requirements for a flock of laying hens calls for a ration containing much the same materials as are required for egg production but not in the same quantity.

In studying these figures to get their true significance, it must be appreciated that any animal will utilize its food first to maintain its own body. It must be kept warm and must use food to enable it to move around in search of more food and it must be supplied with nitrogen enough to repair its waste in body tissue, which waste is caused by the processes of life in wearing down and building up tissue. Feed must be supplied in addition to the requirements for maintenance, if any eggs are to be produced. The greater egg production which is secured will mean a heavier consumption of feed. One of the best indications of the laying condition of a flock of poultry is to see them consuming increasingly larger quantities of mash. This is especially true with pullets which are just approaching maturity. An increased food consumption means that it will be followed shortly with an increased egg yield. If we are to get eggs we must provide the material to make eggs and this may be said to be the only secret connected with the feeding for egg production. To the student of birds and their habits it does not remain a secret long.

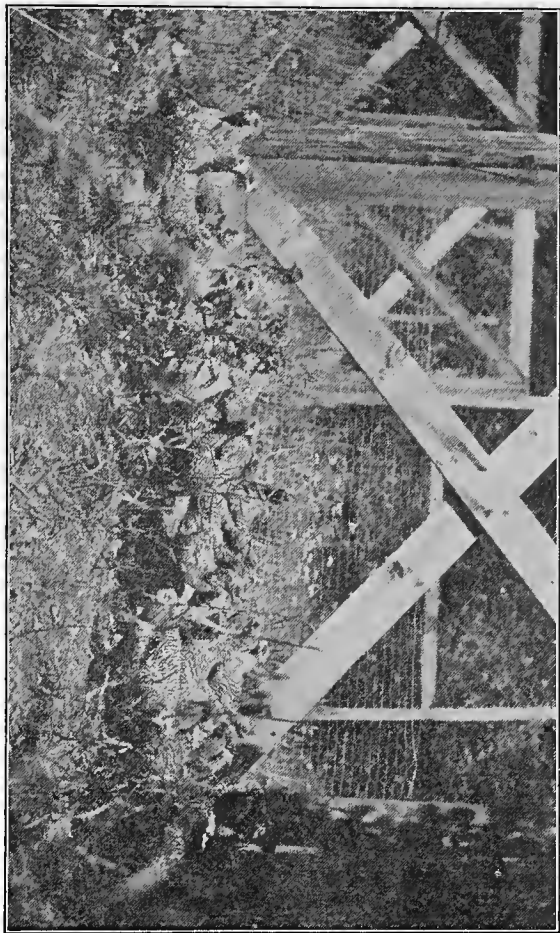
Common Source of Food Nutrients

The following are some of the more common sources of these five important food nutrients. The economy with which they can be purchased and the amount of indigestible food material present will determine which to use.

Table of Feeding Stuffs

Protein—Meat scrap, ground bone, fish scrap, skim milk, milk albumen, linseed meal, gluten meal, soy bean meal.

Fat—Meat scrap, cottonseed meal, sunflower seed, soy bean meal.



A group of Barred Plymouth Rock pullets, such as these, would awaken interest and pride in any poultry raiser.

Carbo-hydrates—Corn, wheat, oats, buckwheat, barley, alfalfa hay, clover hay.

Ash—Oyster shell, ground bone, meat scrap, fish scrap, phosphate rock, wheat bran.

Water—Lawn clippings, green alfalfa, green clover, pasture grass, mangel beets, cabbage, lettuce, sprouted oats.

There are a great many desirable ingredients not mentioned above, but those given are the most common and are all which are needed from which to compound a very satisfactory ration. It will be noted that the protein carriers, from an animal source are also high in ash, especially phosphoric acid. This fact should be especially considered when selecting the different products.

Compounding the Ration

When compounding the ration or when determining upon the kind and amount of each ingredient to use, there are certain fundamental facts to consider which have reference to the efficiency of the mixture as a whole.

(1) The ration, when mixed, must contain sufficient food nutrients. That is, the flock when fed the ration should be able to get from it all the food material which they need for maintenance as well as production. The flock must not be starved, as it were, for such a practice would result in a great reduction in egg yield. If more eggs are to be laid, more feed must first be given and eaten by the birds.

(2) The nutrients in the ration must be in proper proportion for the purpose desired. If the egg production is the object, a considerable quantity of protein must be available, as shown by the previous table. A so-called narrow ration will result, it being expressed by a ratio of one part of protein to four parts of carbo-hydrates and fat. If on the other hand the ration was to be used to feed roasters for market a larger proportion of fat-forming nutrients would be necessary and the ratio would read to every part of protein seven to eight parts of the fat-forming materials, fat and carbo-hydrates. It is important, then, to select such feeds that the relation between the two groups of nutrients will be adapted to the purpose desired.

(3) The ratio as mixed must be palatable. It must be to the

liking of the birds or they will not readily consume large quantities of it. Palatability increases the digestibility of any feed. In order to insure palatability the ration must have considerable variety, that is, it must be made up from a number of different ingredients. Wheat by itself is a balanced ration as far as the nutrients which it contains is concerned, but wheat alone would not make a suitable ration for laying hens during the winter period.

(4) The ration as compounded must be economical and must be easily mixed and stored. The cheapest feed is not always the most economical. Meat scrap of a high grade, containing about 50 per cent. of protein, can always be purchased for \$65.00 a ton and is much more economical than a low grade scrap, which contains 35 per cent. of protein and for which one must pay \$50 a ton. The latter is cheaper, but not so economical. So it is with soggy or mouldy corn, it can be purchased for less per 100 pounds, but its feeding value is greatly reduced.

The ingredients used should be of a nature that a large quantity can be mixed at one time and stored in barrels or bins for use each day. This periodic mixing reduces the labor of feeding and it insures that the rations shall be each day of the same composition.

(5) The last and one of the most essential considerations is that the ration as mixed shall be correctly fed. Regularity in poultry feeding should never be neglected. The birds become accustomed to receiving their feed at a given hour and place and when the time comes they are there to receive it. If the feeder is not on hand a long period of idleness results. After having mixed the best possible ration the feeder must use intelligence and study in making such variations as are necessary for breed, season and age of birds. With these considerations as to the nutrients, their uses and sources, we are ready to consider a definite ration and feeding practice.

A Simple Ration for Winter Feeding

After a careful study of existing methods of feeding laying hens, the majority of commercial poultry plants and most experiment stations have gradually come to the belief that a dry mash kept before the birds in large hoppers, with cracked grains

fed morning and night, in deep litter on the floor of the house, is the best practice. It is true that this system requires the least labor which is consistent with the greatest efficiency and proper personal attention on the part of the feeder.

The following is the New Jersey laying ration and method of feeding. This station has for years been making a careful study of the best rations and methods of feeding for egg production, with the result that they offer the following ration as nearly an ideal standard as it is possible to secure. Any variation must be made at the discretion of the feeder as determined by local conditions.

The New Jersey Laying Ration

The following dry mash is kept before the birds all of the time in self-feeding hoppers:

Ingredients	Weight
Wheat bran	200 pounds
Wheat middlings	200 pounds
Ground oats	100 pounds
Corn meal	100 pounds
Gluten meal	100 pounds
Cut alfalfa	100 pounds
High grade meat scrap	200 pounds
Total	1,000 pounds

The above dry mash is especially adapted to the feeding of Leghorns. Where heavier breeds are kept they will tend to take on flesh if special precautions are not taken. Under these conditions the hopper should be left open only during the afternoon and closed during the morning to compel them to take more exercise.

When the above mash is used during the Summer oil meal is substituted for gluten during the moult and depending upon the amount of range which the flock has access to the concentrated materials are reduced in proportion.

As supplemental to this mash the following scratching ration of whole grains are fed morning and night in very deep litter on the floor of the house. Its primary object, aside from its nutritive value, is to induce exercise and keep the individuals of the flock in

good health thereby. About five pounds of the scratch ration is fed to each 100 birds in the morning at 8 o'clock and about ten pounds to each 100 birds at 4 o'clock in the afternoon:

Scratch Ration

Ingredients	Weight
Cracked corn	200 pounds
Wheat	200 pounds
Oats	100 pounds
Barley	100 pounds
Buckwheat	100 pounds
Total	700 pounds

A good feeder will occasionally go among his flock at night and handle them and after feeling of the crop determine whether he is feeding them the right amount or not.

In addition to the above ration some succulent material, preferably mangel beets or sprouted oats, should be fed at noon, all they will eat up in twenty minutes. Fresh water, grit and shell should be kept before them all the time.

There are no secrets in getting winter eggs. Give the above rations a try. Follow them carefully and above all study the birds.





The pullets that have unlimited range with plenty of shade during the Summer months are those which will develop into layers and breeders of another season.

CHAPTER XI.

RAISING POULTRY AS A SIDE-LINE.

By H. V. TORMOHLEN.

To the suburbanite and small town dweller the raising of poultry offers many wholesome, enjoyable hours of outdoor employment during the year if indulged in merely as a side-line, if fowls are kept only for the purpose of furnishing the table with choice spring fries and broilers and eggs the entire year.

The advantages to the business man in raising poultry on the few feet of back lot or on the half acre at the suburban home are many. There is no employment that offers to the person who is closely confined by office work a greater amount of light physical exercise, or a more pleasant means of recreation than the culture of thoroughbred poultry in a limited way.

To the person who can interest himself in this industry, and who can devote spare time to it with the idea of gaining not only physical exercise, but of acquiring a knowledge of the business that will enable him to excel as a fancier, there is a fascination about the work that increases as experience is gained. The tilling of the soil for the garden of flowers or vegetables is an enjoyable recreation but the garden plot lasts only for a few weeks at the most and during that time very strenuous work it is indeed, while the rest of the year—at the very time when indoor workers need fresh air most—the garden cultivates habits of cozy fireside physical idleness. Our friends, the chickens, require attention each and every day of the year and so we are forced to get out and stir up the straw litter in the scratching shed with the thermometer about the zero mark on those cold Winter mornings, the same as in July. Thus the habit of getting out and exercising in the cold fresh morning air is formed and good habits, if formed in town, invariably insures health and happiness.

It is said that a well balanced variety of tasks makes one task a recreation for the other and to come away from the city and

office with its cares and intense mental exertion and hurry out to the poultry quarters and attend to a nice flock of busy but care-free hens makes life take on a different aspect and the close association with nature relieves the pessimistic and bewildered mind in a very short time. Poultry raising as an occupation might grow monotonous in a very short time to the office man with a brain trained and accustomed to grasp big problems and solve them but as a diversion from the daily grind and routine of life, poultry raising forms an excellent safety valve for the strenuous brain worker.

Starting in to raise poultry may be done on a very small scale or on a more elaborate scale if much experience in the rearing of poultry has previously been acquired. Starting with a couple of old "biddies" and two dozen chicks is much more satisfactory even to those who have had experience, for be it remembered that in this day and age of the world chickens cannot be raised like we used to see our grandmothers back on the farm raise them and even if we think we know a great deal about it because of being reared on the farm or spending the summers at grandmother's, we will encounter difficulties in raising chicks on back lots that we never heard of before.

The different breeds of thoroughbred poultry today are so far superior to mongrel stock for the different purposes for which they were developed that it is nothing short of folly to raise anything but thoroughbred stock. Your individual tastes will have much to do in selecting a breed but do not be unduly influenced by the popular opinions of the day. Tomorrow the fad will be over and you will be wanting to change breeds for the new arrival in popular favor which is declared to be the "greatest layer and best broiler ever."

Eggs are practically indispensable in the modern kitchen and they are used every day in the week while a dressed fowl is used probably once a week. Nice fresh eggs seem to be the hardest to get on the market the year 'round while seldom, if ever, is a nice carcass hard to procure. For this reason I would deem it the better plan to keep fowls primarily for eggs and secondarily for meat. Then again where the young birds must be continuously confined their carcasses, when ready to fry, will have cost more for feed than if purchased on the market as the broiler man on

the farm can raise and market fowls much cheaper on his acres than the city man can on the back lot where he must purchase every morsel of feed.

But eggs can be produced with about one-half the market price of eggs from a good laying strain of hens when confined in very limited city quarters the year through.

There is no best breed or variety. But there are better strains of layers among the different varieties. One Plymouth Rock will lay better than another, because it has come from a long line of ancestors which has been bred for egg production.

Senator Mooney, of Mississippi, recently asked an old colored man what breed of chickens he considered the best and he replied: "Marsa Mooney, all breeds of chicken has de merits, for instance the white ones am de easiest to find after dark and the black ones am de easiest to hide after you once gits 'em."

I chose the Brown Leghorns because I had known from a small boy up that they were noted layers of white eggs. I had seen some flocks of white birds in town and they always presented a dirty appearance. These were the reasons why I decided on the Brown Leghorns but your way of looking at it might lead you to an entirely different conclusion and you might decide on the Minorcas, the Houdans, the Anconas, or the Rhode Island Reds. Then again, as a student of colors as found in nature, I found the Brown Leghorns presented the deepest mysteries and difficulties in combining the shades of any of the Gallinaceous tribes. I found it very hard to produce show-worthy specimens at first and for several seasons my efforts proved a failure in that at least I was unable to produce as good specimens as the parent stock itself. But after delving in nature's laws I finally worked out the principals as to how to mate to make colors reproduce themselves. Indeed, it was such a fascinating study that every leaf and flower and painting that came under my eye was observed closely for some hidden combination or principle in color combinations.

To start in the Spring in raising fowls it would be desirable to purchase baby chicks or eggs from some reliable breeder and place them under a setting hen which you have bargained for from some neighbor who keeps mongrel hens or some farmer friend. Setting

hens should be purchased for not over \$2.50 apiece and they can be sold for \$2.00 when the chicks are raised. The chicks can be kept in a small coop until nearly grown and in the Fall a poultry house can be built.

A house may be built of lumber or cement blocks. From the ground and profile the arrangement of the roosts and nest may easily be seen. Two roosts accommodate all the fowls and a dropping board directly under the roosts keeps the floor free of the droppings and saves floor space. The nests are placed immediately under the dropping board and the hens enter the nest from the back side. A trap-door in front makes the removal of the eggs quick work. A frame on which is tacked muslin and hinged to the roof drops down in front of the fowls at night and keeps them warm in the small roosting compartment and yet admits plenty of fresh air. The floor is constructed of cement and covered with two or three inches of sand which is removed and new added each Summer. A room is partitioned off at one end in which the feed boxes and barrels are kept and in which the setting hens are placed when they incubate their brood unmolested by the rest of the flock. The house may be built any length desired but no pen should be more than ten feet wide as fowls do better if kept in small lots and if the young pullets are kept from the old hens until late in the Spring.



CHAPTER XII.

EVERYBODYS POULTRY HOUSE.

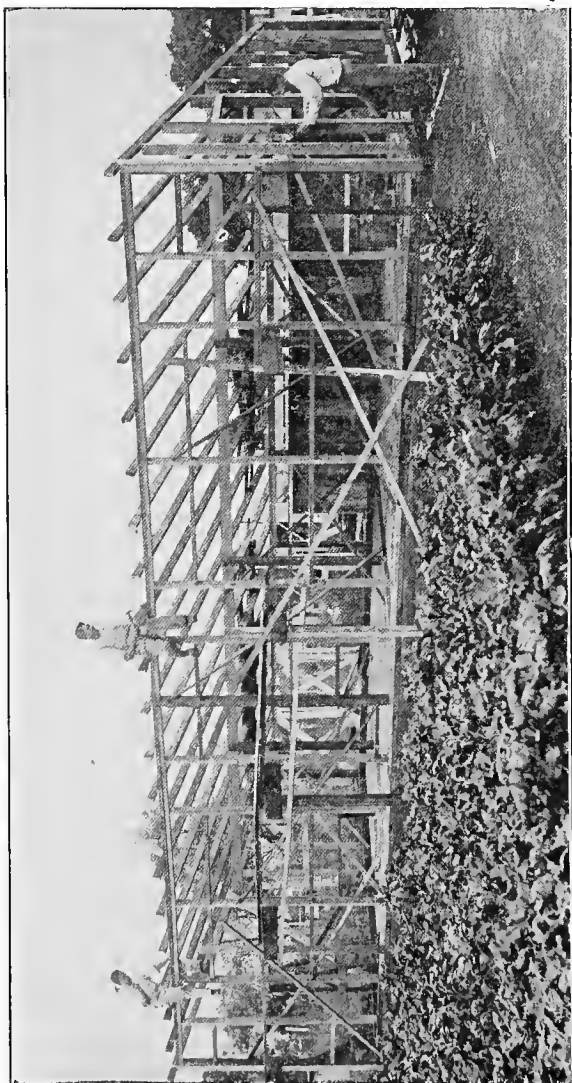
By H. R. LEWIS.

By environment is meant the external conditions which surround the flock, such for example, as temperature, moisture, sunlight, and all other similar factors which in large measure are artificial since they are controlled by the poultryman. A suitable environment means a healthy, contented flock. It is the healthy, contented flock which is capable of producing eggs at a profit and of making satisfactory gains in body flesh. Environment then determines in large measure the resulting profit from the flock. The factors of breeding and feeding are other very essential and fundamental considerations, but even if birds are carefully mated and their offspring well bred, if they are not provided with proper surroundings they cannot develop those inherited characteristics to their fullest degree. To create and insure this proper environment it is necessary to give the laying flock properly planned and well constructed quarters. In other words their house should be so planned and built that economy, efficiency and durability shall be assured.

The Modern Idea in Poultry Houses

For centuries birds, then in the wild state, lived exclusively in trees, until as man developed in civilization and the wild birds of the jungle became more and more domesticated it became necessary to provide them with suitable shelters against extreme weather conditions. As the process of domestication developed and more and more in the way of production was expected from poultry, it became of increasingly greater importance that they should be more securely protected.

The high performing animal, whether it be cow, chicken or horse, is essentially artificial, being the product of man's efforts in this direction. This greater performance is in large part due to greater care in feeding and to a careful study of the most suitable



THE MODERN IDEA IN POULTRY HOUSES

Showing the framing of a multiple unit house. Strong and permanent, but no money is wasted in large lumber or needless pieces. Service and convenience should be first consideration in poultry house construction.

environmental conditions. The New Jersey Experimental Station has for four years been making a careful study of environmental conditions which are best adapted to the maintenance of health and production in the poultry flock. And as a result of this study the requirements of light, moisture, ventilation, etc., have been carefully studied and from the study of many types of poultry houses a type has been evolved which, it is believed, embodies the ideal features of the most efficient and economical house for the laying and large breeding flock. It can be safely said that there is probably no such a thing as a one best house for all conditions of climate, altitude, latitude and the very nature of the type of poultry farming practiced will affect the design. It can be said, however, that there are certain principles which govern the building of a poultry shelter for any purpose, it being the problem of the builder to apply these principles in the most economical manner under his particular surroundings. It is with a full discussion of these principles and a suggestion as to how to apply them that this article will deal.

Principles of Poultry House Design

The following factors govern the design and type of the poultry house, for without them the health of the flock and its continued high production cannot be assured.

An abundance of unadulterated sunlight.

Constant and complete ventilation.

Absolute freedom from moisture.

Sufficient room for the size of the flock.

Protection against excessive temperature.

A neat, sanitary construction.

Proof against rats and mice.

Economy in material and labor.

Convenient in regard to caring for the birds.

All of these factors either as a whole or in groups can be worked out successfully in a great many different types of houses. When, however, the factor of economy be included it becomes a different story. There is found to be one general style of house and one

general scheme of construction which admits of all these principles being economically worked out. The following discussion points to the importance of these principles enumerated above:

An Abundance of Unadulterated Sunlight.—Sunlight is the greatest germ destroyer known. It reaches all cracks and corners where it strikes, killing all germs of disease and cleansing the entire surface. It adds warmth on the short cold days of Winter. Its presence makes the interior congenial and lends contentment to the flock. Every observant poultryman has observed how the birds struggle for the sunny spots on the floor and lie there during the cold weather dusting and taking invigorating sun baths, combined in many cases with a good dust bath as well. The house should be so placed and the front so planned that during the Winter months especially the sunlight will strike every part of the floor at some time during the day. The direct rays of light are the most beneficial, reflected rays not performing the desired function. Remember that sunlight acts as a tonic to the flock, inducing a heavier and more profitable production of eggs and insuring a healthier and more contented lot of fowls. This is what we are all after, so why not see that our birds get the light.

Constant and Complete Ventilation.—Every one of us appreciates the importance of oxygen in maintaining life; how necessary it is in the process of building up waste tissue and in forming new tissue. In these instances it acts as a food, it being carried throughout the body in the blood. Oxygen is supplied to the birds from the air and hence the need of plenty of fresh air in the poultry house. Where a large number of layers are confined to a long laying house, as is so common on commercial egg plants during the Winter, special care must be used to keep the supply of fresh air constant. It is very important to maintain this ventilation without any excessive drafts. The fresh air can best be supplied through openings in the front, so placed that the floor is not drafty. If these openings are about two feet above the floor and provided with muslin curtains, which can be let down during the storms and during exceptionally cold weather, all the fresh air which is needed will be present. The opening should extend practically the entire length of the house and be from three to four feet wide. Some of this space should be provided with glass covering in the form of hinged glass sash to let in light on stormy days when it is necessary to have all of the muslins shut.

Ventilation in the back of the house for use during the Summer months is valuable. It is not only desirable to keep the house warm and dry in the Winter, but it is just as necessary to keep it dry and cool during the hot Summer. No expensive system of ventilators, which sometimes work and sometimes not, are necessary. Muslin curtains and plenty of open front, with back ventilation for Summer use, are all that is requisite.

Absolute Freedom from Moisture.—Moisture wherever found leads to the development of disease germs and general unsanitary surroundings. Moisture in a poultry house causes the birds to become run-down and easily susceptible to roup and its kindred troubles. The designer of a poultry house must guard against three distinct types or sources of moisture, so-called because it exists in the air in the house. It is caused by a large number of birds being confined to a limited area and an insufficient amount of ventilation being provided to carry off the moisture which is given off in their breath. When this type of moisture is present it can be detected by a dampness in the air on entering the house, usually a nasty odor and damp litter. Early in the morning, during a cool night it can be seen in the form of drops of water on the rafters and side walls. The amount in the air has become so heavy that a sudden change in temperature has caused it to become precipitated on the interior of the house. Such conditions are far from healthful. Plenty of ventilation removes this moisture and the carbonic acid gas (a poison) which is given off with it.

The second type of moisture which must be avoided, is termed soil water. It is the moisture which comes up through the soil and if the floor were of dirt and the moisture abundant, would wet the litter and make the house very unsatisfactory. Such conditions are very common where the location is low and the soil heavy and springy. A good concrete floor with plenty of drainage material as a sub-base will prevent this. Elevating the house about two feet off the floor will answer the same purpose, the former method, however, being preferable. Very moist locations should be avoided.

The third type of moisture which may bother the house is what may be termed surface water. It is only apparent when the house is placed in low spots or hollows. In the Spring of the year such places may form small ponds during the melting of the

snow or during periods of freshets. In many instances the writer has seen poultry houses located in such places where at times the water has stood over a foot deep over the floor of the house. It is needless to say that such conditions cannot be tolerated in a successful house. The avoiding of such locations and the raising of the house at least six inches above the top of the soil and placing it on a good concrete foundation are preventatives.

Water of any kind in or about the poultry house is contrary to a congenial environment and to sanitary conditions.

Sufficient Room for the Size of the Flock.—Birds should not be crowded. At least four feet of floor space should be provided for each bird in a given house. The size of the flock must be determined by the floor area. Exercise is essential to health and vigor. The floor is the only place where the layers during the Winter can get this exercise, hence the necessity for a sufficient amount of room. The crowding of too many birds in a given area necessitates extra labor in keeping the floor and litter clean and in maintaining sanitary conditions. When heavy birds are kept, such as Brahmas, it may be desirable to allow more than four square feet to each hen. In the breeding pen it is by far the safest practice to allow each breeder at least five square feet and even more may be advantageous.

Protection Against Excessive Temperature.—The birds must be protected during the Winter from excessive heat. The average hen will stand a considerable degree of cold if the house is dry and well ventilated, whereas, if the house is damp and drafty a considerable warmer temperature will result in serious trouble. A good test is to so build the house that at no time will the temperature and moisture conditions be such that the combs of the birds will become frosted. The small, close-feathered, large-combed breeds of Mediterranean origin, require more protection than the better protected American breeds. A well designed house is so arranged that the temperature given off by the birds can in part be conserved to warm the house. The use of muslin curtains at the front of the house, and if need be, a temporary drop curtain directly in front of the perches in very cold climates, will usually be sufficient protection. Healthy birds and a dry house are of even greater importance than temperature.

A Neat, Sanitary Construction.—The internal construction



SMALL, SUMMER HOUSE FOR OLD BIRDS

Such a shelter located in shady spots, where the birds can have plenty of run, will make ideal conditions for holding over your best breeding birds.

should be as plain as possible. All boards should be planed and set tight, to avoid cracks and holes in which mites may seek a hiding place. All fixtures, such as nests, perches, etc., should be made portable, so that they can be easily detached and taken down for cleaning. The litter should be kept dry and coarse, the windows clean and the walls swept clean. Cleanliness is the next thing to profit in the poultry business.

Proof Against Rats and Mice.—Every poultry house should be so built that rats and mice can find no places to burrow in or about it. A good family of rats will not only destroy many young and half-grown youngsters, but they will eat up large quantities of food, especially if hoppers are used in the feeding practice. A good concrete foundation and floor will absolutely prevent rats from bothering the birds. The foundation should be built deep and the floor of such a strength that they can neither burrow under nor through. The cost of such a floor can often be saved in one year by the saving from loss due to this one source alone. Such a floor, it will be remembered, was recommended as a prevention against moisture.

Economy in Labor and Material.—Along with efficiency, as measured by the factors discussed above, should go that of economy. Economy means money saved in first cost. It means money saved in interest on investment and money saved in heavy maintenance charges. The house which best provides the above conditions at the minimum of cost we will all agree to be the best. It is not always necessary to buy new lumber for the poultry house. Often old farm buildings may be torn down and much of the material utilized, or, as is often the case, such buildings may be of a style which will admit of their being remodeled at small cost into very efficient houses. When purchasing new lumber a very good grade for sills and frames is desirable, while a cheaper grade can be used for boarding and roof, especially if the latter is to be covered with a good grade of roofing paper. Fancy and elaborate plans, with many trimmings, requiring a costly construction, tend to reduce economy as well as efficiency. The comfort of the birds and the fitness of the house is not enhanced in the least.

Convenient in Regard to Caring for the Birds.—When planning the house every effort should be made to have the construction

as convenient as possible. Certain labor-saving devices which have been found satisfactory should be installed, such for example as double swing doors, large self-feeding hoppers, large roomy drinking vessels which can be easily filled and cleaned. Portable nests and all fixtures should be raised above the floor, giving all the floor to the birds and making it easier to care for the flock. A convenient arrangement for removing the litter and feeding the flock is an advantage. Houses and pens should be so arranged that a system of chores can be planned which will admit of as few extra steps as possible in the shortest time possible. All of these things should be foreseen and planned for before a stick is sawed. Convenience means the reduction of labor and a big saving in the cost of production.

A Standard Multiple Unit Poultry House

As a result of the studies at the New Jersey Station it was appreciated that a standard house which admitted of adoption to a variety of uses and to any size of flock and to a great many locations would have many possibilities. With this in view the following style of house was evolved. It was found that a house approaching a square was the most economical to build as it took less wall material. Furthermore, it was decided to adopt a standard size which had a standard capacity and this unit or standard could be indefinitely increased as desired. A unit twenty feet square, that is twenty feet wide and twenty feet deep was used, after much experimental data was secured to prove the value of such a size. This unit has a floor space of 400 square feet, or a capacity of 100 birds. A shed roof type of construction was used, with a front wall nine feet in height and a rear wall five feet in height. When it was desired to house 200 birds a double unit, 40 by 40 feet could be built, and when 400 birds was the desired capacity, a house twenty feet wide and 100 feet long would naturally follow. This scheme of construction has proven very popular in New Jersey and other eastern states. One big advantage is the fact that all buildings are uniform and if at a later date it is desired to enlarge the plant it can be done on a uniform and definite plan.

Specifications of a Double Unit House

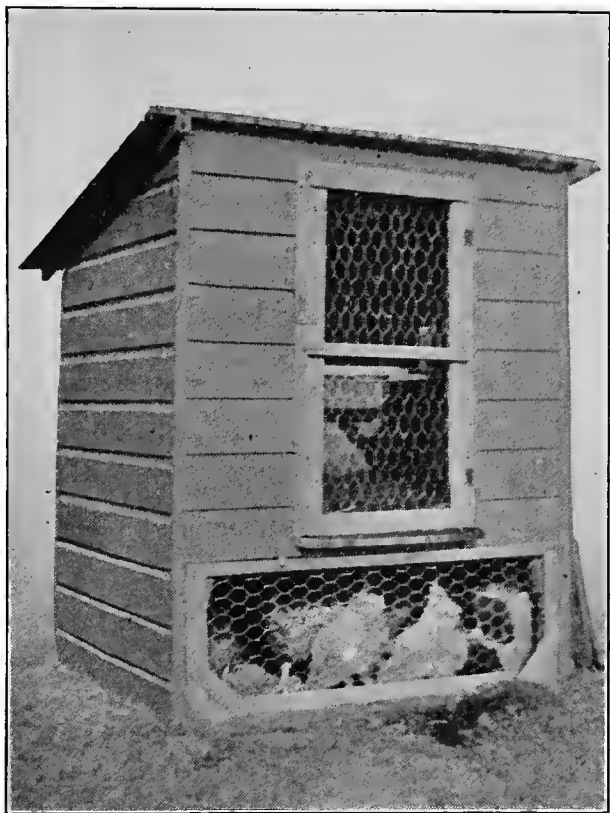
The following is a brief specification of a double unit house with a floor space of 20 by 40 feet. All studding and rafters are

eight by four feet, hemlock or yellow pine. The sills should be four by six-inch material and they should be bolted to a six-inch concrete foundation wall. A two by six-inch girder runs the length of the house supporting the rafters at their center. The girder is in turn supported every ten feet by a four by four-inch post, resting on the concrete floor. The plates are two by four-inch material doubled and joints broken. All outside walls and roof are single boarded with tongued and grooved material. The back wall and roof should be covered with a good grade of roofing paper. The openings in front, where the muslin curtains are placed, are four by ten feet. The curtains are made in two parts and are hinged at the top, lifting up. The glass openings are three by five feet and the glass sash is hinged at the side and opens against the wall on the inside. The dropping boards, nests and perches are all attached to the back wall. They are all portable to facilitate cleaning. The nests are darkened by a hinged door in front and the hens enter from the rear.

A dividing partition is placed between every two units; it is built of boards and extends from the back wall to within six feet of the front wall, the remaining space being left entirely open. This partition is important, as it prevents drafts; when it is desired to use the house for two flocks of birds a light wire partition can be used to close the remaining space. A large dry mash hopper is built in the center of this partition, feeding from both sides. All other fixtures and feeding utensils are placed on an elevated slatted platform just under the muslin openings on the front wall.

Construction of Concrete Floor

When the house is completed, a concrete floor should be laid and should consist of three distinct layers. First, a layer of eight to ten inches of cinders, or crushed stone, well tamped and leveled on top. Next a rough coat of concrete should be laid about two inches thick. It should consist of one part cement, three parts of sand and five parts of cinders. This should be tamped and leveled and over it should be applied the third or finish coat. This should be about one inch thick and should consist of three parts of sand to one of cement. It should be leveled and trowelled smooth. Such a floor is moisture proof, rat proof, vermin proof and is easily and quickly cleaned, and is more



The boy's poultry house. Well planned and built for a small backyard flock.

economical than a wooden floor and more sanitary than a dirt floor.

Material Required to Build a Double Unit

Lumber—Sills, six pieces 4x6 by 20 feet; plates, eight pieces 2x4 by 20 feet; posts, two pieces 4x4 by 14 feet, two pieces 4x4 by 18 feet; studding, nine pieces 2x4 by 18 feet, four pieces 2x4 by 14 feet; rafters, twenty-two pieces 2x4 by 22 feet; frames for nests and dropping boards, five pieces 2x3 by 16 feet; boards for roof, walls and fixtures, 2,200 square feet (eight inch T and G); curtain frames and trim, one-inch by two-inch white pine, 200 linear feet; nests, one by four-inch white pine, 10 linear feet; broody coop, one bundle plaster lath; nails, ten pounds 20-penny wire; fifty pounds 10-penny wire; twenty pounds 8-penny wire.

Miscellaneous materials—Roofing paper, 1,060 square feet, eleven rolls; four special sash, three by five feet; muslin, eight square yards; hinges, locks, tacks, hooks, cement, cinders, sand.

The cost, when we consider the quality and appearance of the house and its efficiency as tested by experimental existence and the favor with which it has been received by the commercial poultryman is certainly very reasonable and warrants the statement that this is an economical type of poultry house and suitable for everybody, whether commercial poultryman or farmer.



CHAPTER XIII.

CAPONS FOR PROFIT

By WILLARD C. THOMPSON

A capon is a male bird from which the reproductive organs have been removed. This operation is usually performed at an early age before the distinct characteristics of the male have developed and before the flesh has become hard and staggy, as they say. A slip is a male bird from which the reproductive organs have been carelessly removed, a part of them remaining in the body. Birds of this latter class develop much the same as do the unaltered males, and do not possess the characteristics of the capon. A bird that has been carefully caponized is entirely changed as to physical make-up and appearance. The plumage becomes like that of the female and is usually very full and long. The comb stops in its development and wattles do not fully mature, both giving the head a weak, effeminate appearance. The spurs do not grow normally and the bird becomes docile, tame and unafraid, showing a lack of vigorous spirit, which is usually associated with a fully developed male bird.

There are several reasons why male birds that are caponized and then fattened for the market will be much better meat and more economical than the roasters:

1. Capons reach greater size and produce carcasses that are heavier and meatier than the ordinary roasters. This is undoubtedly due to the fact that all the food materials taken into the body are quickly transformed into meat and fat. This additional size and weight can be produced in shorter time than could equal weight and size be put on the cockerels.

2. Capons fatten more quickly and easily than do cockerels, mainly because of the quiet, docile disposition of the capons. Much less energy is wasted by fighting, etc. Capons take on flesh and fat very rapidly and will turn grain into meat much more efficiently than will cockerels. Experience has proven this fact among the capon raisers.

3. Capons produce a flesh that is considered of a much higher quality than that of ordinary roasters. This is the reason that the hotels and markets in general are willing to pay several cents per pound more for capons than for roasters. Capons are always considered to be a dish of special quality when offered on hotel menus. This better quality is a reality, for the meat is softer, sweeter and tenderer.

4. Capons produce a meat that commands a higher market quotation than do roasters. This difference is often measured by at least from eight to ten cents per pound. This surely is enough to warrant investigating the way and manner of producing capons. On a ten pound capon a dollar extra in market selling price would certainly pay for much more than the added feed required, if any were required.

5. Capons are always in demand, for the supply has been far below the number wanted by the great markets of the country. I believe that we can safely count on finding market for capons produced.

6. Capons can be kept in comparatively large flocks and thus be more economically handled during the period in which they are being prepared for the market. They endure confinement much better than do cockerels, which fact also adds to the efficiency of handling and preparing for market.

When to Caponize

There is no hard and fast rule that can be laid down as to exactly when a bird is ready to be caponized. This is due to the difference in development between birds of different breeds, and even of different varieties and strains. Age is a poorer standard to go by than size, for the latter is of much greater importance. Some birds reach the proper stage at a much earlier age than others. In the case of cockerels of the general purpose breeds it is advisable to caponize when the birds are weighing from one to one and a half pounds. For the heavier purely meat breeds another half pound may be added before the operation is performed. At the time that birds reach this size the combs and wattles will begin to show development, another sign of the proper age at which to caponize. If birds are caponized too young there

is much greater danger of bleeding to death, there is not sufficient vitality with which to resist the shock of the operation, and the organs are not of sufficient size to make the operation sure and complete. When the chicks are a bit larger the hole which it is necessary to make for the operation is not proportionately so large



THE WAY TO PICK A CAPON FOR MARKET

The feathers for several inches on the neck, on the last two joints of the wing, on the saddle and a small band around the hock are always left on the bird, thus distinguishing it from the roasters.

and will heal sooner. If, on the other hand, cockerels are allowed to go until the combs and wattles have developed, they will make less desirable capons, the organs will have become too large to grasp easily and safely in the instruments, slips will be common, and the flesh will not be as good. There is a time at which the

operation should be done, and this should be learned through experience, guided by the points brought out above.

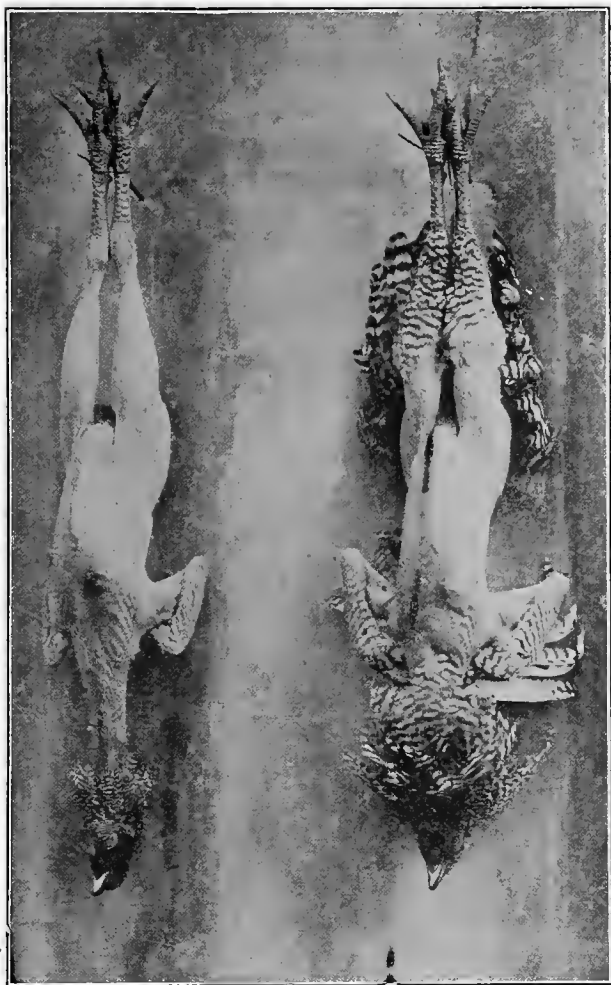
The Operation

There are two important parts to the operation of caponizing, one of which is to properly prepare the birds for that operation, and the other is to properly perform the various steps of the operation itself. One is of as great importance as the other.

The birds to be caponized should be starved for from thirty to forty-eight hours. The purpose of this is to empty the intestinal tract of all materials which might be in it. This means that all food and water should be withheld. The cockerels should be kept in a clean pen which is not littered, for they may pick up bits of the litter when they get hungry. Try to get the intestines empty and keep them empty until the operation is over. The object of this starving is to put the internal organs, primarily the intestines, into such shape that they will easily and readily fall to one side when the bird is strapped on its side and the incision is made. If they have not been starved the full intestines get in the light and in the way, making the operation very difficult, if not impossible.

The operation should be performed in a room or place where there is plenty of light. This may be done in the sunlight or with the aid of an electric light globe. Good light makes the operation especially to the beginner, much simpler and easier. A table or barrel may be used on which to place the bird. Any surface on which the bird can be stretched out on its side will suffice, providing it is small enough to be convenient to work around. A couple of holes bored in the top of a barrel about ten to twelve inches apart will do very well, if only a few birds are to be operated upon. There are several commercial caponizing tables on the market that are excellent and handy where a large number of birds are to be caponized. The legs must be fastened down securely, usually by tying a string about the knee joints and dropping the string through one of the holes and either tying or weighting it. The wings should be folded back over the back and tied down in a similar manner. This leaves the bird stretched out across the board on its side, which is the proper position, as the incision is made through the side of the bird.

When the bird is fastened down and the instruments are in



A COCKEREL AND CAPON DRESSED FOR MARKET

The neck, tail and thigh feathers are left on to distinguish the capon from the cockerel.

readiness, a few feathers should be plucked from the region of the side under the wings toward the hips, covering the first three ribs from the back. Then dip the fingers in a disinfectant solution and moisten the spot, spreading the feathers back from the place where the incision is to be made. The bird will be placed on its left side, if the operator is right-handed, and on the right side, if the operator is left-handed. This will bring the ribs into proper position for ease in operating.

With a sharp knife, (a penknife with small blade will do) make an incision between the first and second ribs, starting about one inch from the backbone and cutting away from it for about the length of one inch. This incision should cut the skin and muscles covering the ribs. Just inside the ribs will be found a thin membrane which will be pierced and spread to one side. Below this are the intestines. Look toward the region of the backbone and the yellowish testicles will be seen in plain view. One is on either side of the backbone. After the spreaders have been applied the hole in the side is of sufficient size to allow of the operator's seeing the organs perfectly. With the removers carefully grasp the lower testicle and clip it off first, withdrawing it and again inserting the instrument to get the upper one. This is done because if the lower is not taken first the blood may hide it. Use extreme care not to get anything else in the cutting parts of the removers than the organs sought, and use great care to avoid severing the large veins which will be seen to be located near the organs. If the lower organ is not easily seen and possible to remove at once it may be advisable for beginners to make another incision from the other side, removing one organ from each side. With practice, however, both can be removed from the one side. After the operation is over remove the spreaders at once, wash the wound with disinfectant and place the birds in a clean cage.

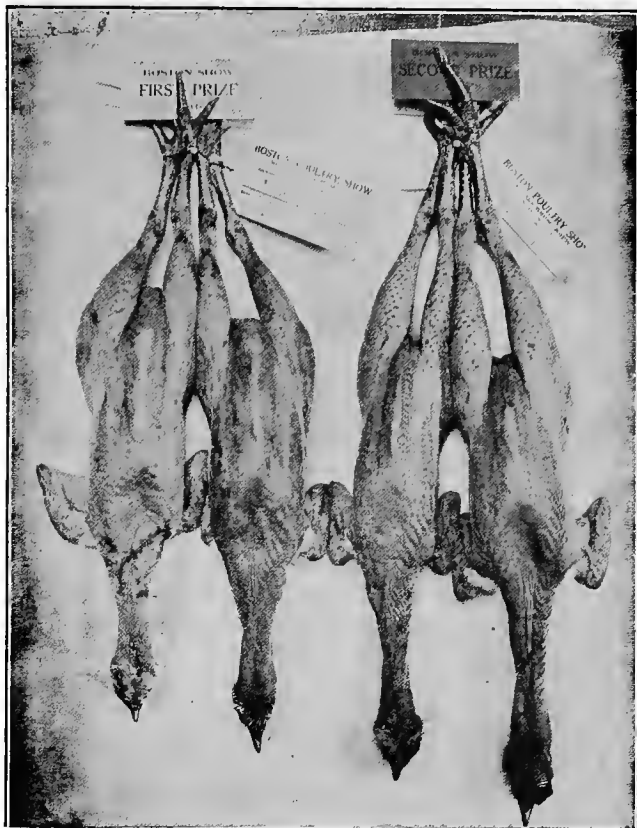
The only instruments needed for caponizing are a sharp knife, with a small blade, a pair of spreaders and a removing instrument.

Feed the capons sparingly for the first few days, giving moist mash in limited quantities at a time. After a few days they can be fed regular growing rations and finally placed on fattening rations.

Capons should be handled about a week after they have been

caponized to examine them for wind-puffs which will be apt to appear beneath the wings. Burst these with a knife. Do not keep capons with cockerels, giving them preferably quarters by themselves or allowing them to run with the pullets.

Market capons usually during the holiday season.



PRIZE WINNERS

Market poultry well conditioned before killing assures the best price for the producer. Here are shown the winners at a late Boston Show.

CHAPTER XIV.

OPERATING THE COLONY BROODER STOVE

By H. R. LEWIS.

Of all the operations incidental to the management of the poultry flock there is probably none which should be more carefully planned or executed than that of brooding. It is here that much mortality may occur, due to improper temperature or faulty feeding. It is here that the start must be given the youngsters which will insure a continuous uniform growth. The size of the flock is ultimately determined by the ability of the poultryman to supply each year new pullets to replace those birds which must be sold on account of age; hence the proper method of brooding which will allow at the same time for large numbers and efficiency is a factor which must be carefully determined by each poultry raiser.

During the past few years the so-called colony or coal-burning brooder stoves have attained rapid development until, at present, they offer a very satisfactory type of brooding equipment. Before the advent of these stoves it was necessary to brood either in a large number of small capacity units or to invest a large sum in the building and equipping of an intensive long pipe brooder house which, at best, could be used but a few months during the Spring of the year. The development of the colony stove with its large capacity and single unit source of heat, combined with its portability, has made possible an equipment which can be used, not only for brooding, but after the youngsters are old enough to do without heat, the stove can be removed and the pullets reared in the same houses. If desired such houses can be used for small flocks of special mating during the Fall and Winter. The brooder stove, considering its large capacity and the relative low cost of supplemental equipment is, on the whole, a much cheaper form of brooding than any of the previously practiced methods. The results which have attended the use and development of the brooder stove do, I believe, insure its permanence and with a few minor improvements this method is destined to be used

almost exclusively on farms where any considerable number of chicks must be reared each year.

Types of Brooder Stoves

The popularity and demand for these stoves has resulted in the manufacture and sale of a great many different types and styles. The fuel used to generate the heat in nearly all cases has been coal. Some manufacturers have, however, used kerosene, while some have used crude oil and some even gasoline. The coal-burning stoves seem to be by far most satisfactory considering the great variety of conditions under which they must be operated. A great range of sizes has been built, from those advertised to accommodate 1,500 chicks down to those of 200 chick capacity. The very large stoves came at the very beginning of the boom and was due to a desire to claim wonderful advantages for the type. Experience has shown that it is impossible to build a stove which will successfully care for much over 500 chicks. A larger number will be apt to crowd, and it is not possible for the one attending to such a large flock to observe the conditions of the individuals in the flock. From 200 to 500 chicks seems to be the safest range for uniform excellent results. The stoves range in cost from nine dollars to thirty dollars, the more expensive ones being better built, having larger fire pots and hovers with more sensitive methods of temperature control and a better system of drafts. It is generally the best to buy a good stove, one which has the necessary details in its design, even though the first stove cost is greater. One will very quickly get his money back in ease of operation, uniformity of temperature and permanence of the equipment.

There are two general types of construction used, namely, large metal hovers, elevated from one to two feet above the ground and built so that the hover sides slant and are held at an angle of about 45 degrees to the floor. Such stoves heat the floor under the hover by deflection; the heat from the stove strikes the slanting bottom side of the hover when it is deflected down on the backs of the chicks. The other method is to have the hover top flat or nearly so and attached to the edge of the hover is a large heavy felt or canvass curtain which holds the heat in near the stove and the chicks, when they want to get warm, enter this heated compartment. Both types seem to have certain points in

their favor. If curtains are present, they should not extend clear to the floor but should be elevated to a height of about four inches favor. If curtains are present, they should not extend clear to the floor but should be elevated to a height of about four inches to insure circulation and entrance of fresh air. When buying a brooder stove one should look for three features above all else, namely, the size of the fire pot, the method of temperature regulation and the size of the hover. Regarding the first point the stove with the large fire pot is most desirable as it is capable of holding enough coal to burn throughout the night, thus making midnight trips to coal up unnecessary. Also, such stoves are better able to take care of the temperature during the early months when there is apt to be sudden changes in temperature during the night, especially cold waves accompanied by high winds. Such a stove with plenty of body to the fire will burn fast or slow according to the adjustment of the drafts much longer than a small body of coal. Where the brooders are located in large rooms as they should be, to give plenty of area for the large number of chicks, this increased body of coal is necessary to maintain a sufficiently high room temperature. Regarding the method of temperature regulation it may be said that the simpler the mechanism the better, namely the fewer number of working parts and the more simple the motions which are necessary to convey the energy of the thermostat to checking or increasing the fire the better.: The more direct this control the less power is required for regulation and hence the more sensitive is the method. Simplicity means efficiency. The thermostat itself must be placed so that it cannot be affected by anything except temperature. Chicks should not be able to roost on it nor should it be where it can easily become hit or broken when caring for the fire. The thermostat should be located under the hover about six inches above the floor and some distance removed from the stove, usually from twelve to fifteen inches. It is at this point or more nearly this point that the chicks will usually be found at night and hence it is from here that the temperature should be regulated. Some simple method of adjusting the dampers in order to vary the temperature should be present. Usually a thumb nut or screw, so arranged that a slight turn will open or close the dampers a trifle, as may be desired, is best. Some stoves are equipped with a double wafer thermostat,



which seems to be an added improvement. Regarding the size of the hover, it seems that the larger it is within certain limits the better, as a hover which is too small does not give the chicks sufficient room under which to adjust themselves to the proper temperature. A hover from 40 to 60 inches across is none too large for 500 chicks. A moderately small stove with a large hover is better than a large stove with a small hover. The large hover allows of a considerable variation in temperature under same, it being hot near the stove and much cooler on the outer edges, thus allowing an opportunity for the chicks to adjust themselves to the proper degree.

Operating the Brooder Stove

The successful operation of a brooder stove depends upon four factors: First, its location; second, the care of the fire; third, the feeding practice and care of the floor; and lastly, the management of the chicks.

The location of the stove should be such that the room or rooms will be well ventilated yet free from drafts and so planned that they can be kept warm during the early brooding months of February and March and can, on the other hand be kept cool during the warmer months of May and June. It is a large square room, about twelve by sixteen feet square. The front wall should have some glass to admit sunlight and some muslin to admit fresh air. The room need not be very tall, simply high enough to admit of no inconvenience in doing the work. A shed roof house five feet in back and eight feet in front works to a very fine advantage. The square room places the stove at an equal distance from all walls and corners and there seems to be less tendency for the youngsters to crowd under these conditions. A plan, which is often followed with success, is to have the house equipped with two rooms, a so-called hot and cold room, each room being about ten by fourteen feet square. The hover is placed in one room and the chicks allowed to feed and exercise in the cold room adjoining. They are allowed free access from one room to the other. This method is especially desirable in late Spring brooding as it enables the keeping of the chicks much cooler than is often possible where they are continuously kept in the same room with the hover. Brooder stoves are frequently assembled in long buildings which are divided into a number of different compartments, as specified

above. The colony house which is semi-portable and in which the pullets can be left until they have been grown to maturity seems to be the most useful under the greatest variety of conditions.

In caring for the fire it is very important that the stove be assembled and the operator thoroughly schooled in the method of regulation and the care of the fire for a number of days before the chicks are placed under same. It is well to proceed as follows: Upon the arrival of the stove, it should be uncased in the building where it is to be set up and the directions for its assembling and operating read carefully. After which it should be assembled slowly and with care. Before a fire is started the operator should carefully trace all adjustments and dampers, being sure that he is familiar with the principle of their operation. When setting the stove up it is well to put a piece of asbestos or tin under same to insure against the possibility of fire. When attaching the chimney it is an excellent plan to have same leave the building through the side wall. This prevents rain from running down the pipe into the stove and rusting same, and it also allows of more stove pipe on the inside of the building to help keep the house warm. After leaving the building the pipe should be carried up at right angles so that the top of the pipe is higher than any part of the roof, thus insuring a good draft at all times. A pipe cap can well be placed over the top to keep out rain and control draft. After assembling and connections are completed, the floor should be covered with a thin layer of sand and over this short cut alfalfa or clover. A fire should then be built and the stove operated for two or three days until it can be maintained at the proper temperature and run regularly. This previous running to regulate and test should be done before each brood.

It is usually necessary to coal the stove twice a day, morning and night. The procedure should be to first shake down the fire until red coals appear and then fill the fire pot or coal chamber to the designated height with coal. In very cold weather it may be necessary to leave the lower door open a short time after coaling up in order to bring the temperature up rapidly. The doors or drafts should never be opened and left open for any length of time as the fire will burn up too hot and will result in a continued high temperature. It is best and safest to adjust the thermostat properly and leave the control of dampers entirely up to the regu-



lating method except in a very few special cases, such as very cold weather, very windy weather or very hot weather, at which times it may be necessary to do some extra adjustment. Never allow ashes to accumulate in the ash chamber. Never shake the stove with the ash door open and never go away and leave the stove with the draft dampers open.

The feeding of the large flock is similar to the feeding of smaller flocks, except that care must be taken to feed enough and to distribute it that all will have an equal chance. The grain rations should be scattered about the entire floor of the house and the bran and mash should be provided in long hoppers so that all of the chicks can get at it. Water should be given in a number of different vessels and in different places. Grit and shell finely ground should be given in abundance. Sour skim milk, if available, is a very desirable asset to the ration. It makes a better growth and keeps the digestive system in good working order, avoiding much of the common loss from diarrhoea. A most excellent feeding practice is as follows:

The first day under the hover give nothing but grit, shell and water. The second day give three or four feeding of oat meal only small quantities at a feeding, so each chick can have but a few pieces of the oats. The second day begin feeding a fine chick grain ration five times a day in the litter. A good home mixed ration is: 40 pounds fine cracked corn, 40 pounds fine cracked wheat, 20 pounds steel cut oats.

On the fifth day wheat bran can be put before the flock in small hoppers well distributed about the house. At this time the grain feeding can be cut to three times a day. By the fourteenth day the chicks can be given a well balanced dry mash in the place of the wheat bran. Such a mash can well be made by mixing: 50 pounds of wheat bran, ten pounds of gluten feed, ten pounds meat scrap, ten pounds of corn meal, ten pounds of ground oats and ten pounds of bone, ground dry.

At seven to ten weeks of age the fine grains can be changed to a ration made up of equal parts of cracked corn and whole wheat. Fresh water, skim milk and plenty of green food should be given in addition to the above. As soon as the ground is dry the chicks should be gotten out of doors. Plenty of run should be available

and they should be induced to stay out doors all they will as soon as the weather permits.

There are certain special features of management which must be followed with large flocks to prevent accident. The first is the desirability of confining the chicks near to the hover during the first week. The corners of the room or house should be boarded off so that there will be no chance of the chicks crowding in them. This can be done by placing an eighteen inch board about one foot wide across the corner and nailing it fast. At night it is a most excellent plan to have a long piece of two-foot inch mesh wire adjusted about the hover so that it is about two feet from the hover. In this manner the chicks will not be confined directly under the hover, but they will be prevented from getting away from the heat entirely and going to the corners where they would crowd, resulting in many suffocations. This wire need not be used after they are four weeks old.

Another important feature of management is to reduce the size of the flock after they get to be about six to eight weeks old. As they grow they continually need more room and finally, if the death rate has been low the chicks will be so numerous and large, that the house will not accommodate them. If the flock is not reduced in size a loss of weight, or so-called growing light, and a high mortality will be sure to follow. It is an excellent plan to separate the cockerels from the flock and either place them under a separate hover or in cold houses by themselves. They make better growth by so doing and the pullets themselves mature more uniformly. This should be done as soon as sex can be distinguished and as soon as it is safe to do away with artificial heat. In the case of early broods it should be done before heat can be eliminated in which case another heated hover should be used.

The colony coal burning brooder stove, while a recent product, has nevertheless proved its usefulness and has come to stay. Its successful use depends upon first, securing a good well built stove and capable of uniform regulation. Secondly, if success is to follow its use, the poultryman must understand the working of the stove and the proper method of firing. He must also use care in feeding and appreciate that his flock contains often ten times as many chicks as was formerly kept in each flock when small

unit hovers of fifty chicks were used. This means that much more grain must be fed and same well distributed. And lastly, if he is to secure a lot of husky pullets and cockerels from his flocks, he must understand certain details of management; namely, that he is handling a lot of individuals in a single flock and that he must



Interior of a modern laying house. A happy lot of layers, a pleasure and a profit to own.

govern them accordingly to prevent crowding and the corresponding check in their growth. The colony brooder stove saves labor, entails less investment in brooding equipment, costs less to operate, makes possible the rearing of a greater number of chicks and, if understood and run properly, results in the highest efficiency. At least 80 per cent. broods should be expected.

HOW TO SELECT LAYING HENS.

By B. F. KAUPP.

The indications that a bird is physically qualified to produce eggs are—a clear, full, bright eye, the eyelids wide open and not sluggish; a good strong pair of shanks, with straight well worn toe nails showing constant use in scratching. Only a healthy fowl is a laying fowl and such a bird must of necessity have a good appetite. A hen that is laying has an enlarged abdomen, due to the enlarged intestines, ovary, and oviduct, and the body is deeper at the rear than at the front of the keel. These points are not so well marked when the hen ceases laying.

In the non-laying hen there is likely to be unusual accumulation of fat in the abdomen and under the skin of the body so that a plump appearance presents itself; the fat under the skin of the shanks, especially in the posterior parts causes that part of the leg to have a round appearance. When this hen is in her laying period this surplus fat, to a certain extent is used and the shanks lose their round plump appearance and the same is true of other parts of the body especially in the region of the pelvis and vent. The face appearing more plump and fat thins out and the skin of the face, comb, earlobes, wattles, and also over the body becomes more soft and pliable as the hen passes from a non-laying period to a laying period. These changes in the comb, earlobes and wattles are sex characteristics and become changed as just stated as the ovary and oviduct become enlarged and active. When the hen passes from a laying to a non-laying state the ovary and oviduct shrink and the comb, wattles and earlobes lose their full, soft, pliable, and red appearance becoming more dull in color and covered with dandruff or scales of epithelium.

The pelvic bones are wide apart in the heavy producer but contract again when she ceases to lay. The fullness of abdomen and width of the pelvic arch will depend on how heavily the hen will lay during the next two or three weeks. At the same time the pelvic arch enlarges, the abdomen also enlarges, and the vent

grows larger and flabbier. A heavy laying hen has a soft and flabby vent, as compared with the small, hard, puckered vent of the non-laying hen. The heavy laying hen has a soft skin all over the body. The non-laying hen has a hard, plump body with bones not too evident. A pinched body indicates a small capacity and a poor producer. The meat type bird has a tendency to turn her feed into fat which is indicated by the thick pelvic arch and a hard abdomen. In the laying hen the ischial bones of the pelvic arch are thin. In the heavy laying hen there is noted bleached shanks, beak, earlobes, eyelids and vent. The rapidity with which the yellow pigment disappears from any part depends upon three factors: first, the amount of blood circulating through the part; second, the nature of the food supply, and third, the amount of fat stored in the part. The yellow color is due to xanthophyll which occurs principally in the green feed, thus the more green feed the bird consumes the slower will be the bleaching of the parts when the laying period begins. In the heavy laying hen the capacity will be indicated by the distance from the posterior point of the breast bone to the pelvic arch which should be three or four fingers' breadth, and the pubic bones in the region of the vent should be two or three fingers in breadth. In the non-layer these pubic bones may be scarcely one finger's breadth apart.

Culling should begin in June as soon as any of the hens stop laying and should continue in the Fall until the flock is reduced enough to make room for the well-developed pullets. If the culling is to be done at one time it should be done in September when all hens that have stopped laying should be disposed of. The early molting hen is a poorer layer than the later molter, so that the late molter, as a rule, should be saved for next year's breeding.



CHAPTER XV.

WINTER RATIONS FOR LAYING HENS

By H. R. LEWIS.

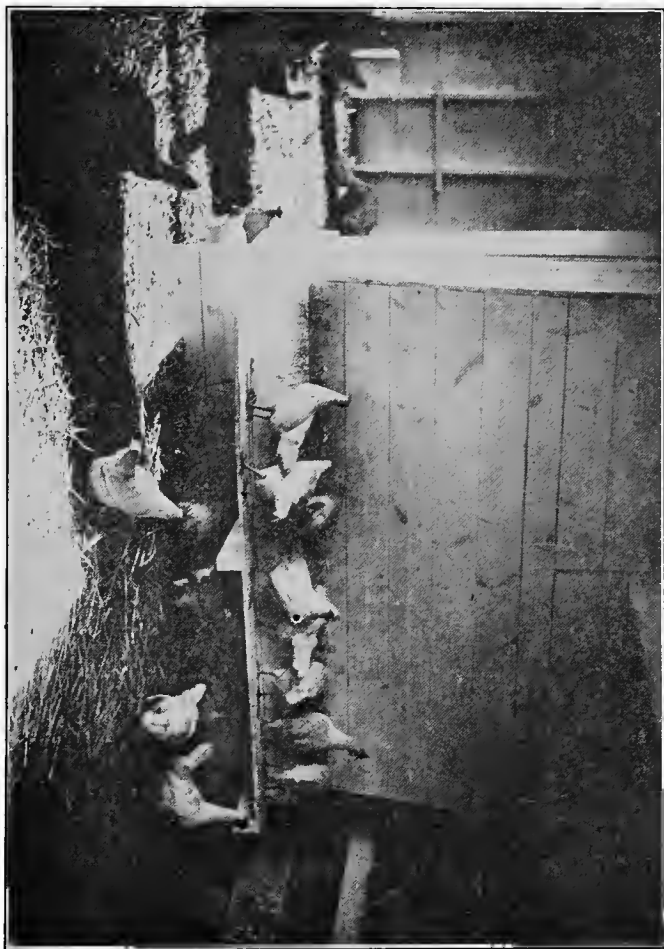
The feeding of poultry, whether for eggs or meat, is always an important factor in successful poultry keeping. It is in fact one of the four corner-stones of successful management, the other important factors being the quality of the birds themselves, their environment or housing conditions and the capabilities of the man caring for them. Of all these the man is by far the most important factor, for without experience and training and without a natural interest in and liking for the birds he cannot give them the proper care. Given good stock, suitably housed, success can be made or lost by the character of the feed given and the manner and amounts fed.

The Problem

The problem of feeding layers naturally divides itself into three groups, namely, the proper method of feeding, the proper amounts to feed and, lastly, the most perplexing problem of compounding the exact rations in such a manner as to insure the proper balance of food nutrients and at the same time produce the most economical mixture. This last part of the problem is an especially hard one to discuss for publication or to make recommendations about for the prices of feeds are constantly changing and what would be an economical and efficient mixture this month could possibly be greatly improved the following month due to changes in prices and supply. The problem is one then which requires constant adjustment and the purchaser of feed should weekly study price changes and supply and must expect to have to alter rations in such a way as to adjust his practices to conditions.

Proper Method of Feeding

The feeding of laying hens has long discarded the old practice of feeding all the mash in the form of a moist mixture and instead has adopted the more modern and efficient method of feeding the



THE LARGE SELF-FEEDING DRY MASH HOPPER.
This is the most economical and efficient method of feeding the laying flock.

mash dry in large self-feeding hoppers. This practice reduces labor, allows the birds to balance their own rations and experience shows that the use of dry mash is the more efficient of the two methods. There are times, however, when a moist mash can well be used to supplement the dry mash, these being during the Fall when pullets are first housed and when it is desired to reduce the maximum consumption of egg forming material. Such mash should be fed in troughs and should be only moistened, with either water or better skim milk, but it should never be mixed sloppy. Only enough should be fed so that the birds clean it up quickly and none is left to get sour and become a source of disease and sickness. Supplementing any mash ration, scratch grains should be fed in deep litter at least twice daily, morning and night. Such rations are most generally composed of the more common grains and the feeding of them in deep litter compels the birds to take sufficient exercise. Hopper grain feeding of laying birds is not generally advisable for many reasons. The more important being the absence of exercise and the fact that the amount of grain consumed cannot be accurately controlled.

Proper Amounts to Feed

One of the most important problems with which the feeder must be concerned is the proper amounts of his various rations which it is desirable to feed. It is perfectly possible to mix two very desirable rations, one a mash mixture and the other a grain mixture and to have the total or combined mixture which the flock consumes entirely out of proportion to the requirements of the birds due to their consuming improper amounts of each. Careful studies have been made to determine the relative amounts of grain and mash which a normal laying flock should consume. The results show that a common failing is to feed too much grain. The scratch or grain ration does not contain sufficient protein to furnish the raw material from which to make eggs but provides the material primarily required for energy and heat. If then, too much grain is fed the birds cannot consume sufficient mash and they grow fat and do not produce. Furthermore, the grain mixture is costly and it is economy to restrict the consumption, as much as the proper balance of the combined ration will permit. A good rule to follow is the following: from the time maturing pullets are placed in the laying house they should be compelled to

consume at least as much mash as grain, as they continue to increase in production and the requirements for protein and egg forming material becomes greater, the practice should be of gradually decreasing the amount of grain fed daily until during the Spring season when egg production is at its height. A flock producing heavily will quite frequently do best when they are consuming three parts of mash to one of grain and at a recent Vineland Contest there were short periods when the flocks were consuming five parts of mash to one of grain. As production decreases during the Summer the grain should be increased slightly until during the moulting or resting period they get back into a normal fifty-fifty basis and even two parts of grain to one of mash when feeding the light breeds is not over-feeding of grain, at this season. As a point at which to start it may be said that a flock of 100 Leghorn pullets just commencing to lay if fed from 10 to 12 pounds of grain a day will consume at least an equal amount of mash and as they increase in production the mash consumption will show a decided increase. This amount of grain can best be fed at the rate of about three to four pounds in the morning and seven to eight pounds at night in deep litter to each 100 birds. Pullets of the heavier American varieties will consume slightly increased amounts. Remember that the amount of mash and grain fed is just as important as the make-up of the rations themselves if the food material which the flock receives is to be balanced to their needs.

Proper Mixtures to Feed

Before determining the exact make-up of the rations two things must be determined: first a standard mash and grain mixture which has been used successfully should be used as a basis from which to make any modifications which price or supply seem to dictate; secondly, one or more separate quotations should be secured from reliable grain dealers giving the prices for which the various products of definite quality can be purchased for. With this information and a knowledge of the composition of the common feed stuffs, which information can be secured from any reliable text book on poultry feeding, it is possible to make intelligent modifications of formulas to meet changing markets.

The following is the dry mash used during the past season so successfully at the Vineland International Egg Laying and Breed-

ing Contest at Vineland, N. J., together with the scratch grain ration which was used with the above mash. It is presented here as a basis from which to make appropriate modifications.

Vineland Dry Mash.—Wheat bran, 100 pounds, wheat middlings, 100 pounds, ground oats, 100 pounds, corn meal, 100 pounds, meat scrap, 100 pounds.



The Campine is a prolific layer, in fact they have the habit of filling the egg basket.—J. T. H.

Vineland Scratch Ration.—Cracked corn, 100 pounds, whole wheat, 100 pounds, whole oats, 100 pounds.

In the above it will be seen that a 20 per cent. meat scrap mash is used and that considerable corn and wheat is called for in the scratch ration.

CHAPTER XVI.

PRESERVE THE SEED STOCK AND CARE FOR IT.

By CHAS. D. CLEVELAND.

There is a strong temptation in Summer to kill off much of the old stock. "What is the use of keeping a three-year-old hen or cock when the younger birds will lay more eggs and perhaps give better fertility?" says one. "Why feed birds all Summer and Fall when they are giving little or no return?" says another.

Even some of the oldest fanciers are now looking at their good breeders and wondering how many they will keep longer, instead of making up their minds how few they will sacrifice as in former years.

Is this the proper attitude to take? Is it policy or economy or sound business judgment to dispose of a bird whose ability as a producer or as the sire of producers is known? What excuse is there for such a course which a year or two ago would not be thought of for a moment?

The pessimist has been advocating a more or less wholesale slaughter for many months. He has been howling about the fearful price of grain and the lack of help and the uselessness of "extra" birds on account of the labor of caring for them.

He always likes to croak and invariably finds some reason or other for his depressing views. This same pessimist is a very active fellow, always on the lookout for someone to talk to an ever ready to give his advice whether it is wanted or not. He is constantly prying into other people's business and is the self-appointed bringer of bad tidings. But what about his arguments in this particular case; should we pay any attention to him now, although we have turned a cold shoulder to him in the past? How about retaining a number of old birds that are not at their best?

Is it proper or right when everybody in the land is talking conservation, thrift, economy and saving, to feed good grain and

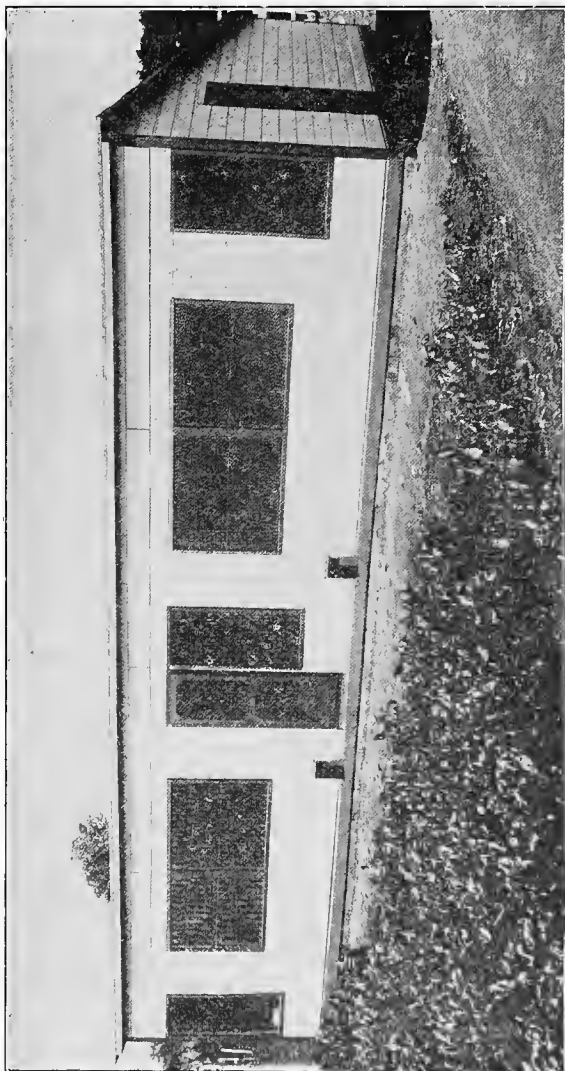
valuable mash to such birds? We almost come to think that the calamity howler is right for once in his life. But let us stop to think, in the first place let us look at the flock of this wise head to see if he has any birds that are fit to be retained. Let us see if he would be making any sacrifices by sending his old birds to the butcher. We take an unexpected and hurried visit to the yards of this man who talks so long and so loud on the black side of things and we find a few poor, half-starved fowls that do not look to us as if they ever were worth raising. His young stock is about our heels looking for something to eat and his whole flock presents a typical example of false economy and neglect. Shall such a one as this lead us? Shall we put ourselves in the same class by following in his lead? We conclude not and return home where our own birds looked better than they did an hour ago, when we left to pay a call on this undesirable neighbor. We sit down to actually number over and count the birds, which we were beginning to think would have to go. First there is male No. 277, he is three years old and got into a fight this Spring so that he could not be shown again. True, he has been a winner of note and done a lot of advertising for us in the show room but should he be kept over when his usefulness as a show bird is gone? There we think to look up his breeding record. Yes, he was the sire of numerous winners for us last season and the season before and we sold several hundred dollars' worth of his get. We conclude that it would be absolutely foolish to literally throw away one of our very best breeders without giving him another chance. Then we see hen No. 1481 running around the yard. She has been laying pretty heavily this Spring and her feathers are partly gone and the rest stained and dirty looking. She does not appear to be anything very particular and we are just going to mark her down for slaughter when we again think of the breeding record for we have forgotten just what she has done.

To our astonishment we find that she was the mother of three of the best pullets we had in the egg-laying contest last year and that still another daughter is one of the greatest layers we have on the place. This saves her life also. And so we go through the flock occasionally singling out a bird that has not made good, but pretty generally finding that there is a lot of good in nearly all the older birds. They look in good condition, too; their eyes are bright, their combs are red and they seem full of life and vigor.

So we go back to the house to think the matter over just once more.

Are we to pin our faith on the tried performers or are we going to take the big change and use only young birds that have shown what they could do? Again we think of what other breeders of live things have done in the past, we know that the cattle breeder always keeps his tried bull; we remember that the swine raiser hangs on to his sow that has invariably given him a large litter of strong pigs. We recall that the lover of fast horses continues to breed to the sire that begets winners, even if he is spavined and lame himself. How else can progress be made; how can the families of our live creatures be maintained and continued unless the prepotent sires and dames be given a chance to multiply in such numbers as to enrich and build up the various breeds and varieties to which they belong? If we kill the foundation stones of our flocks of poultry, how can line-breeding be continued and therefore how can we have any reasonable assurance of what our youngsters are to be? These are the questions that we ask ourselves as we sit in the office and try to plan out our best and most economical course for the months that are to come. We begin to feel that Mr. Pessimist was "talking through his hat"; then we feel that our flock, at least, showed us that he might be wrong and finally we decided that he did not know what he was talking about and was all wrong. We have made up our minds, nothing will induce us to exchange certainty for uncertainty; most of our stand-bys will stay for another year and we will cull our young flock more carefully.

Then we begin to make our plans for the care of our breeders during the Summer. Mr. Pessimist said that it would take a lot of grain and mash to Summer these birds; but will it? Why no, nature will help us out of this predicament just as she has in hundreds of others. We hitch up the old horse and haul a few colony houses up near the patch of woods and between it and the corn field we give them a good spraying, put some nice clean sand on the floors; open all the windows and put a big mash hopper, filled with a very mild mash in one corner. Then we go for the birds, give each one a good dusting, treat the legs with a generous application of lard and sulphur; drop a couple of liver pills down each throat and gently put them in their new quarters some evening.



A double section of the multiple unit house completed. This house, 20 x 40 feet, has a capacity of 200 laying hens and cost, complete with labor, approximately \$300.00.

We know that they will pick up most of their own living for the rest of the season. A small feed of grain occasionally and the keeping of the mash hopper in proper order will suffice. We can visit them once a day or even every other day and gather eggs if we wish and nature will do the rest. In the Fall these birds will go back into the breeding pens in splendid condition after a natural rest and a period of recreation that will mean plenty of eggs when they are needed and strong vigorous chicks.

This is not very expensive or arduous, is it? It is just letting our breeders rusticate as they would do, in the wild or natural state and every experienced breeder knows that it pays. The males of course should be by themselves and a little patience will permit their being kept together in fairly large numbers. There will be a few fights, but little damage will be done provided one male is put out first so as to become the dominant factor and the "boss" of the outfit, the others added at night and after they have been away from the females for a short time. If the preservation of the seed stock of the country is as easy as this, who could be induced to let priceless birds go to the slaughter house?

The writer has practiced the above method for many years and knows whereof he speaks; there is no exaggeration or minimizing of the statements made.

Small flocks or even pretty large flocks, if necessary, can be maintained throughout the Summer season in just the manner described. The birds thrive but do not get too fat, they moult out in fine shape; their legs look like those of pullets at the end of the season and they have received the rest that they are entitled to. In large commercial flocks of layers the females are ordinarily not retained beyond the second year, but on every well regulated egg farm there should be a flock of foundation hens that must be treated in this manner and the economy of the plan is beyond dispute. Today, this month, this year, is the time of all times when the greatest care should be taken of the foundation or seed stock. Enough birds of proven merit have already gone to the shambles and the account of stock shows alarming decreases.

Even when conditions were different from what they are today, how many men have seen their mistakes in selling or butchering birds that they should have kept? Hundreds of times men have

called themselves all kinds of names for doing just this thing and many have not even waited to see how the first crop of chicks looked before the fathers and mothers went the way of all flesh.

I have done it myself in more than one case and then eternally blamed myself for my foolishness. It is not always the handsome horse that wins or the good-looking cow that gives the most milk or the best appearing hen that presents us with the prize winning pullets, instead of saying that it is wrong and a waste of time, feed and labor to keep over the breeders of last season, I say that it is actually sinful not to do so. Our failures in judgment and forethought at this time will be made to look doubly stupid and silly in the days that are to come. If we are to remain in the poultry business at all, we must stand by the birds that have given us our living in the past, and that will do so in the future. If we are to give up the breeding of poultry, let us advertise that fact and give the braver and harder-headed man a chance to buy our birds, rather than to simply waste them by sending them to the butcher.

Have we any real right to use tried, pure-bred birds, which are capable of making a good living for some one, for soup?

To my mind the situation is perfectly clear, it is our plain duty, even if it were not sound business judgment, to keep and care for our breeders. It may mean bankruptcy for us if we do not and it can spell a thriving business for the future if this item of the poultryman's calendar is properly looked after.



CHAPTER XVII.

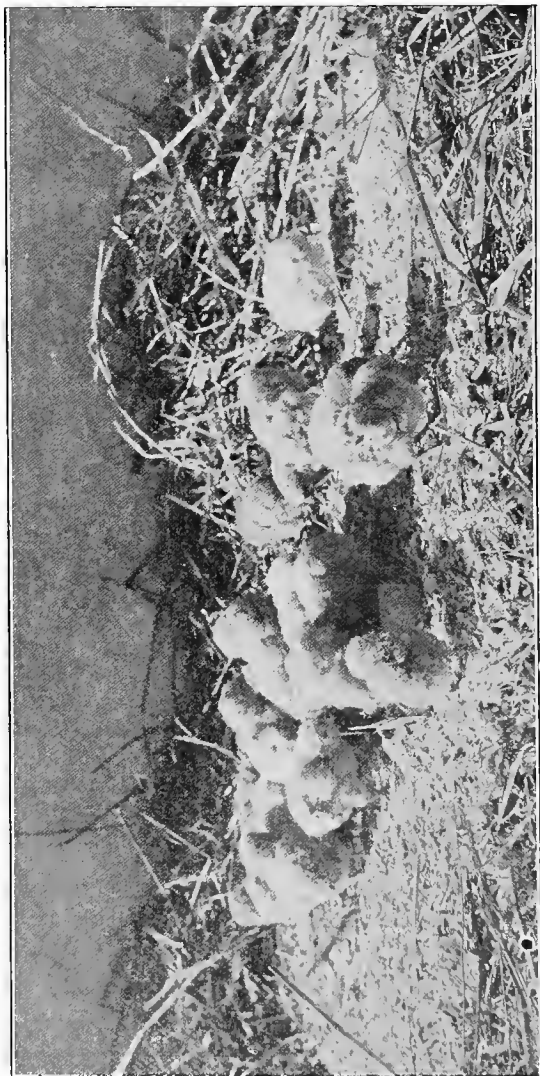
GROWING THE CHICKS

By T. F. McGREW.

The one thing that causes the greatest loss today in the growing of "live stock" is the lack of vitality. Too much coddling is to blame for much of this and carelessness in selecting breeding stock comes next. The keeping of fowls shut up the greater part of the entire Winter and pushing them for eggs, then adding another push in the Spring for more eggs for hatching is another cause for the trouble. Then again when the chicks are hatched too many of them are crowded together in flocks that are kept in hot houses with no chance whatever to even see the ground much less go upon it. The one way to grow healthy chicks that will be strong and vigorous is to hatch and brood them with hens and to let them run out in the open on the ground as soon as they are able to run about; of course, the ground must be dry.

We know full well that incubators and brooders must be used; for in no other way can a sufficient number of chicks be hatched and reared to meet the demand for market poultry. Be this as it may, such poultry can be hatched and be reared artificially and plenty of it can be grown in that way; at the same time some can be hatched and reared each year by hens. There are no other ways that equals nature's way and in no way can vigor be improved except by nature and by selection. The breeding stock that lays the eggs should be carefully selected. The hens kept to lay the eggs for hatching should be yearlings or two years old. The males with them should be fine in form and full of vigor. All eggs used for hatching should be selected for size, shape, smoothness of shell and for color.

Not only can the form and the feathers and the markings of the feathers be controlled by selection, but in the same way will be controlled the shape and the color of the eggs. Some individuals of all breeds will lay eggs that are quite different from others of the same variety in the same flock. Rhode Island Reds lay on the



"Babes in Chickland" enjoy the cleanest and most sanitary of surroundings and are fed to insure strength and continuous growth.

average the darkest shelled eggs of all the American breeds. The White Wyandottes are apt to lay eggs the shells of which have less color than is usual with the other varieties. Some of the White Plymouth Rocks lay eggs that have but little tint in the shell. Some of all of these lay eggs the shells of which are quite dark, and some of the Rhode Island Reds lay eggs the shells of which have a paler tint than is usual with them.

To influence the shape and the color of the eggs that the pullets lay; you must select eggs of the shape and color desired and use only such for hatching. Even more than this is needed. The males used for mating with the hens that are kept to lay the eggs for hatching must be bred in line from males and females that lay the kind of eggs hoped for. We had experience with a large flock of White Leghorns that were remarkable for the beautiful eggs they laid. The eggs were fine in size, shape and smoothness of shell and beautifully white. Some eggs for hatching were brought in from another flock that laid eggs that were remarkable for beauty. Some beautiful cockerels and some fine pullets were grown from them. The cockerels were mated with some of our own best hens, these cockerels had a bad influence, some of the pullets hatched from eggs fertilized by them laid eggs having tinted shells and it took two years of the most careful selection to breed it out.

Brooding the Chicks

We heard a lecturer say that twice as many chicks were lost in brooding than were lost in hatching. Another said, we can hatch the greater part of all fertile eggs but we cannot raise so many chicks. They both meant that it was more difficult to brood the chicks than to hatch them. The cause for this is that we try to keep too many in one place. Years ago hovers or brooders were made for twenty-five or fifty chicks. When large numbers were brooded a pipe system was used. Today they brood from one hundred to a thousand chicks under one hover that is heated by a stove. The principle is good; but the number brooded in so small a space is so remote from nature as to make most difficult the rearing of the chicks.

The cause for this will be found usually in the room where the hover is kept being rather small, and there not being any place for the chicks to go for exercise in a cooler atmosphere. To succeed

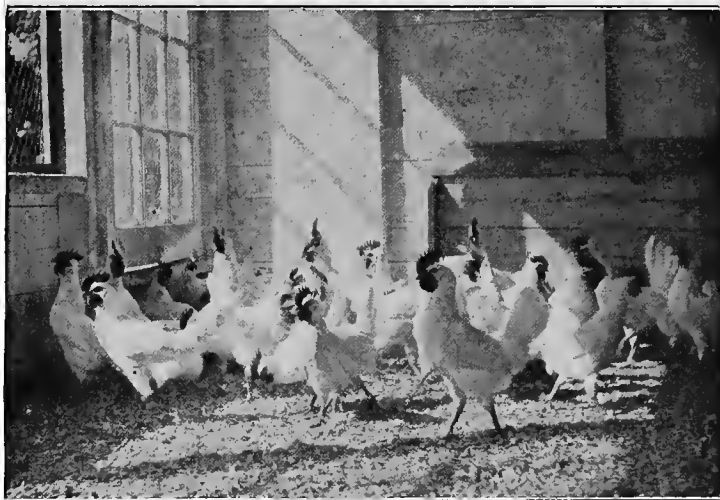
with chicks under a large brooder there should be two rooms—one for the hover, the other for the chicks to run in and out of from the hover. They should be permitted to go and come at will, the same as they would if brooded by a mother hen. The outer room should be built on the south or southeastern side of the house. There should be glass windows in the south side so located that the sun will shine through on to the floor. The opening from the hover room should be about six or eight inches high above the floor and several feet long. A hanging cloth, like is used for small hovers, should be fastened above the opening and it should hang down to within an inch of the floor. The chicks will run in and out under this curtain and heat sufficient will go through to keep the outer room warm enough for a nursery.

Young chicks need exercise; in fact they must have exercise or they will not thrive. Those who have had experience know that chicks will not thrive without it, and they are on the alert continually to keep the chicks moving. They scatter a little feed here and a little over there to coax them to run about. One who was very successful would throw just a little sprouted oats to the chicks, just a little at a time and often said he for there is nothing that will induce them to run about like the sprouted oats. One will get some of it and others will try and pull it away. They will pull and fight for it because there is not enough to go around. If a lot is fed at a time, there is no inducement for the chicks to squabble for it. Another inducement for exercise is small pieces of raw meat, just a little at a time, watch them run and fight for it. They will often tumble over one another in their strife to get the meat. All of which is healthful exercise.

Dry mash is good for the chicks. They should have all they will eat of it. It should be kept before them constantly in a hopper from which they can help themselves. The hopper should be placed in the most distant spot of the nursery away from the hover. This will compel them to go to the hopper for the mash which is exercise. The litter on the floor should be dry and clean so that all grain can be fed in the litter. It is not best to have the litter so deep as to be heavy for the chicks to work in. The best kind of litter is cut clover or alfalfa hay, chaff from the hay mow or short cut straw. They are valued in the order named. Dry sand is the best covering for the floor with the litter on top. The

litter should be raked over frequently enough to keep it clean. When dirty it should be replenished.

Some have trouble with the little chicks losing the use of their shanks and feet. This is apt to come from running continually over board blocks that are covered with sand and litter. These become so very dry as to sap the moisture out of the shanks and feet of the chicks. There is a way to remedy this that is very successful. To succeed with its use requires caution and common sense. To apply the remedy, the litter must be raked from the



These cockerels are developing finely because their surroundings are conducive to a rapid and continuous growth.

sand, the sand passed through a sieve that will take out the droppings. Some wet sand is then mixed in with the dry, about one-third damp sand with two-thirds dry sand, or the dry sand can be moistened a little with a rubber bulb sprinkler like a florist uses to moisten the plants in his window. The secret is to moisten the sand just a little, then put the litter back on the sand. The chicks will scratch in the sand and the moisture in the sand will relieve the dryness of their shanks and feet.

The one danger in this remedy is too much moisture. One

whom we told to use this remedy, wet the litter and sand with a sprinkling pot. Too much water made the floor so damp that the chicks took cold. If used at all it must be done right or trouble will follow. Too much coddling and too much heat is quite as bad as is lack of care and too little heat. There is only one way to brood chicks and that is to have sanitary places for them; keep their brooding places clean, and feed and water according to rule.

Feeding the Chicks

There are so many good chick feeds offered for sale that no one can go amiss in buying them for their chicks. Buy the best, not the cheapest. It costs so little to feed a lot of baby chicks for the first four weeks that one can afford the best for them. Feed grain and dry mash as mentioned in a former paragraph, in addition to this give the little chicks some dry bread crumbs or some corn bread. No wet feed of any kind other than some stale bread moisture pressed out between hands, feed some of this. Avoid the use of wet feed and slops. Chicks are not pigs. Slop is for pigs. Seeds, small particles of grass and bugs are for birds and little chicks. They say that more chicks are killed by too much feeding rather than too little feeding. No chicks that have plenty of exercise and proper feeding are apt to die of too much feeding. Thousands do die from over-eating because they do not exercise. Keep them moving and they are not apt to eat too much. The facts are that about one-half of all poultry does not have proper nourishment after they are six weeks old.

There is only one way to grow poultry properly and that is to feed them all they will eat of wheat, corn and oats after they are six weeks old. If there was no other grain than these poultry would prosper better than they do with so many kinds. A grain mixture composed of one-half wheat, one-fourth cracked corn and one-fourth oats with dry mash will grow all young fowls so fed to a quick maturity provided they get all they will eat of them. Barley is good but not a necessity. Whole oats for the grain mixture and ground oats for the dry mash are the very best next to wheat. Cracked corn is the best of all if properly fed, which means it goes best with wheat and oats. This kind of feeding will grow the chicks to maturity. It will make hens lay and helps them through the molt. The one additional thing needed is meat scrap, about five per cent. of the entire ration. All poultry must have grit and

green feed, this is always conceded in addition to the grain and dry mash. The meat scrap can best be fed mixed into the dry mash for chicks of all ages that have a free range, five per cent. of the dry mash should be meat scraps; more than this for those that are shut in and that do not have free range. From seven to ten per cent. of the dry mash can be meat scraps when fed to chicks that you wish to grow fast for table poultry. Less will answer for pullets grown for egg production.

We of this country do very little in the rearing of chickens during the Winter months. It is the habit in some of the southern states to hatch during the first months of the year. There might be more of this done to advantage. In England where the climate is mild, somewhat like we have in the Carolinas and yet they have snow and cold winds, there many farmers attempt to rear Winter chickens. One of the best informed writers of that country has said recently that those who attempt to grow Winter chickens make a great mistake in trying to coddle them. He says that the youngsters want more care bestowed on them than do those hatched in the natural season. Nevertheless, it does not answer to bring them up as hot house plants. As long as the weather is not too severe, they should be reared out of doors; and so much the better for their welfare if they can have a wide range. If the chickens can get a good range over the fields and in hedge rows and are fed with well prepared food, they will generally give good results. For stock-chickens, a soft food diet is not an ideal one, being apt to produce soft bones; but since it is not strictly adhered to by many of the best rearers of table fowls, it is good enough to follow.

The writer further suggested that when the cold season sets in it is a good plan to mix the chickens' food with milk instead of water; but if the supply is short or the price is high, the breeder should not hesitate to add fat or good drippings to the ration mixed with water. The fat should be chopped fine or be boiled in water to render it soft and the whole liquid poured on the mash so that it will mix rapidly.

One would imagine that this referred to growing chickens to conform to what are called soft roasters in the Massachusetts' districts. There the soft roasters are hatched early in the Fall and they are kept out all Winter in colony houses and fed heavily on feed of all kind that will make them grow fast and fatten.

CHAPTER XVIII.

COLONY HOUSES FOR USE ON THE SUMMER RANGE.

By WILLARD C. THOMPSON.

As the Spring season advances and the chicks which have been hatched in incubators and brooded either under small hovers in a long house or possibly in larger colonies under coal-burning stoves, are ready to be transferred to the ranges over which they are to roam for the Summer months, the very vital problem faces the poultryman as to what must be done to keep the chicks growing continuously and vigorously from the time they are placed on the ranges until they are selected for the laying pens in the late Fall. The problem of rearing chicks satisfactorily is undoubtedly one of the most difficult parts of the business. It may be partially because the press of other work in the Spring season sometimes breeds a bit of carelessness, it may be because the factors influential in the continuous growth of young chicks are not fully understood, or it may be that the fact of the rapid growth required of young fowls together with the climatic conditions, which are prevalent at this season of the year may tend to make this part of the poultry raising proposition a rather difficult one. The great majority of losses are usually traced to the growing season. It is this fact that makes a little extra thought and attention at this time worth much in gaining better successes the coming season.

When Are the Chicks Ready for the Range?

Perhaps the first step, or shall we call it mis-step, which is responsible for considerable trouble on range during the hot weather lies in the fact that many chickens are not ready for the ranges and life in the colony houses when they are forced to start it. There is a whole lot in knowing just how to get the chicks ready for range conditions. They should be "hardened off," that is they should be accustomed to conditions which are somewhat similar to those under which they will be expected to grow and thrive on



Two colony houses where the pullets are grown to maturity.

the ranges. Chicks, brooded artificially especially, are surrounded with heat for the first few weeks of their life. There is a definite source of heat to which they can go when chilled. This means that they must be broken of dependence upon this artificial heat when on Summer ranges, under average conditions. Gradually decrease the temperature under the hovers until the end of the sixth week when, unless weather conditions are very adverse, chicks should be getting along splendidly without any heat furnished. Then they should be kept in their original brooders for a couple of weeks, if possible, so that they will be accustomed to getting along without extra heat when shifted to other houses. Sudden changes between brooder conditions and colony house conditions often are responsible for much crowding and consequent troubles. It has been the writer's experience that chicks can be very safely transferred to Summer colony houses if they have been properly fitted for the conditions which they will meet with there.

The breed of chicks and other factors, such as size and development, will play important parts in determining exactly when the chicks are ready to be moved. Leghorns and other light breed chicks which grow and develop very rapidly will often be ready for colony house life before the chicks from heavier breeds. The chicks should be fairly well feathered when transferred. The necessity of using the brooders for later hatches will also figure, but it is poor, or at least not economical management to injure the earlier broods in order to accommodate later hatched chicks. If chicks are to grow on Summer range without suffering setbacks, or stunted periods, they must be properly treated and managed during the first several weeks of their lives. Under average conditions chicks will be old enough to be transferred when from eight to twelve weeks of age.

The Role of the Summer Colony House

What do we mean by a Summer colony house? It is a shelter for the growing chicks during the period after they leave the brooders and before they are ready for the Fall markets or for the laying and breeding pens. In nearly every region where enough chicks are raised to warrant the use of colony houses, these houses are primarily to serve only the purpose of protection during the night, the birds being given the liberty of the range or fields during the days. Growing chicks must lead an out-of-door

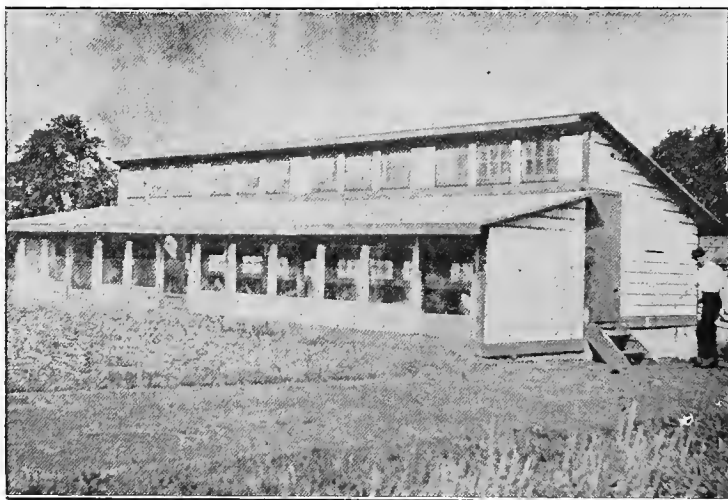
life. They need unlimited fresh air in order to develop their bodies at the tremendous rate at which they are supposed to grow. But at night, while at rest, it is positively essential that the growing youngsters must be protected not only from climatic conditions, such as rains and winds, but also from enemies and thieves. Therefore, in planning the colony houses which are to be used, they must be built to furnish these two vastly important factors, fresh air, without wind and rain, and protection from enemies. Plan to surround the birds at night with the same unlimited fresh air which they are continually breathing in during the day. Plan to furnish a simple shelter which will give them plenty of room to roost comfortably during the night. This sounds simple, but when a real analysis is made of many Summer poultry yard troubles, the fact is unearthed that the colony houses have not played the role which they should, even though that role was simple and could have been easily furnished.

Essentials of a Good Colony House

The first questions which naturally arise when one considers building new colony houses for use on the Summer poultry range are with regard to the size and capacity of such houses. How large shall they be made and how many youngsters should be allotted to each house. The idea of the colony house in itself is a partial answer to this question. It conveys the idea that the flocks are to be divided into smaller units for the purpose of more economical and more efficient management. I believe that under average conditions the most successful rearing is done in colony houses built for fifty chick flocks. This number of chicks can be very safely raised together with little danger of loss from overcrowding. To accommodate flocks of this size a house approximately six by eight feet should be built. Such a house can be readily moved about to suit one's plans during any season, and yet it is large enough to furnish the factors necessary.

What are these factors? In the first place, every colony house should be planned and built with greatest and most careful regard for an abundance of fresh air at all times. The open front colony house has solved this problem. Nearly the entire front of the colony house can well be left open, covered with wire netting, as a protection against enemies of one kind and another. There should be an opening in the upper part of the back of the colony

house through which a circulation of air would constantly be playing, yet not at the same time causing direct drafts to strike the birds. The foul, moisture-laden, warm air from the chicks' bodies rises and will be carried away, if proper facilities for ventilation are afforded. The growing chicks need more fresh air in comparison with the size of their bodies than other farm animals. Yet they are perhaps more susceptible to injury due to faulty ventilation than are the other farm live stock. This fact increases the importance of carefully planning the simple yet efficient system of getting fresh air in abundance. In the second place,



A practical poultry house with plenty of sunlight and fresh air. Excellent for a laying or breeding house.

closely allied to the factor of fresh air, is the factor of roominess in the house. If the youngsters are forced to roost in houses that are badly over-crowded they are deprived of the fresh air during the night, and as night is nearly half the time, it is a serious matter. Crowded conditions in the colony houses result in many chicks becoming stunted, for the weaker vitality chicks are not given a fair chance to develop. They will go under and gradually become sick and anaemic. There should be plenty of room

for each chick to perch or roost in the colony house without piling up close to its nearest neighbor. In hot weather this crowdedness suffocates many chicks and weakens many others. The room in a colony house is often measured by the length and number of perches afforded, for growing chicks large enough to put onto Summer range are usually almost ready for perches. It should not be encouraged too early, especially in case of the lighter breeds as it has a tendency to cause crooked breast bones. Nevertheless youngsters soon develop that natural instinct to perch, for it is undoubtedly a true instinct inherited from the original wild ancestors of the fowl. The perches in a colony house should be placed from ten inches to twelve inches apart, center to center. Two-inch by two-inch material, planed and the upper corners slightly turned with a plane, makes excellent perches. There is little reason why there should not be at least five perches in a house eight feet deep. This number will accommodate the fifty growing birds admirably. In the third place, the colony houses should be simply, but permanently constructed. The mistake is very often made of making the Summer colony houses too elaborate and too complicated. They should be built along as simple lines as possible. Make a colony house with as few corners as you can. The shed-roof type of house is hard to better, all things taken into consideration. A height of six feet in front and four and one-half feet in the rear suits the average requirements. As it is not necessary for the man to enter the colony house as he has to the laying houses and breeding pens, the question of head room is relatively unimportant and the construction is more economical. Another plea for simplicity and straightness of construction lies in the fact that such houses are much easier to clean and keep clean. Sanitation is one of the limiting factors in successfully rearing chicks. Preferably use planed lumber, as this does not furnish hiding and breeding places for vermin and disease germs. The floors, which will of necessity in a movable house be wooden, need not be doubled, but should be of matched lumber. In fact I do not think there is any better material to use in constructing a colony house than tongued and grooved white pine, beaded on the outer side possibly for appearance sake. For roofers yellow pine eight-inch boards are good enough, as they will be covered with a good two-ply roofing paper. This type of construction is not costly, and is extremely efficient and per-

manent. When building colony houses it is false economy to build loosely constructed affairs which last for but a season or two, especially if one is desirous of continuing in the poultry business. A few good timbers put into a colony house will add permanence and stability to the outfit, and help to insure colony houses that will last for years.

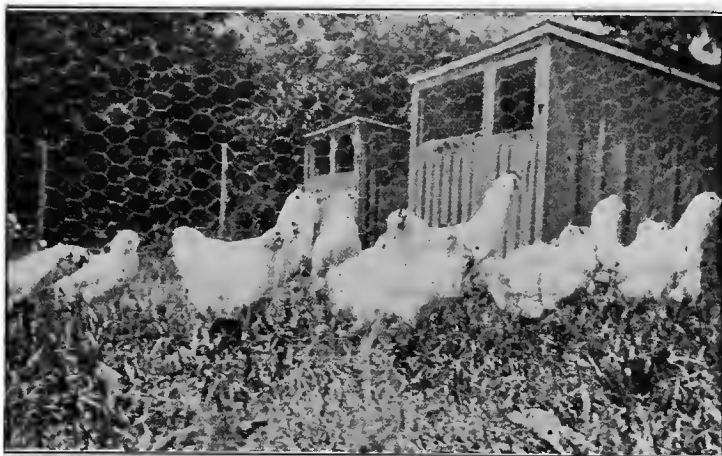
The Equipment of a Colony House

Do not plan to fill the colony house with hoppers and devices which may be found on the market. In the main, try to keep the colony as much as possible absolutely free of fixtures of any kind. It may be necessary during the early part of the season to place the dry mash hoppers and water fountains within the colony houses, especially if the birds are to be kept housed until accustomed to their new home, but after these preliminary days are past the mash hoppers should rest for the greater part of the time, always during good weather, in some shady part of the range near the houses. The water pails or fountains, should be kept under trees near the houses as well. The large, covered dry mash hopper, which permanently rests on some part of the range solves the problem very well. If nests are necessary, and they will be on Leghorn ranges, the same can well be constructed outside the houses, but should not be placed within them. The colony house is sleeping room for the chicks, nothing else. It is usually full enough fulfilling that responsibility. The only necessary equipment that should be furnished in the colony house is the muslin curtains over the open front. In seasons of frequent chill rains during the Summer season, these become necessary.

The Management of the Colony House

After having built the colony house it is essential that the most fundamental principles of good management should be considered in their application to the colony houses. The health and steady grow of the chicks will be measured very largely by the conditions which are maintained throughout the season in the colony houses. At the beginning of the Summer season, about a week before the chicks are ready to be transferred to the colony houses, clean the houses thoroughly. Sweep the walls and ceiling with an old broom. Clean out any litter and manure which might have remained from the previous season. Do this on the morning of a bright clear day. After having swept well, spray the interior

with a five per cent. solution of some good coal-tar disinfectant. Allow to dry thoroughly before putting in any litter. Only an inch or two of these is necessary. The main object of using litter is to keep the floor clean while the chicks are confined within the houses, tend to keep the floor dry and absorb moisture from the droppings, and aid in removing the manure as the season progresses. This thorough cleaning should only be necessary once during the season. Close watch should be kept of the inside conditions of the colony houses from time to time, primarily for the purpose of detecting red mites and keeping the air fresh and clean by the removal of manure. If driving rains beat in enough to make the litter wet, it should be removed and the colony house



A healthy lot of about ready-to-lay pullets. They look it, don't they?

dried out. Wet, damp colony houses develop roup, chicken-pox and similar troubles. Examine the perches frequently, looking carefully under the perches where they rest upon the supports. Here often times red mites will be found. If they are found, paint the perches with kerosene. Keep the outer sides of the house well painted as a matter of preservation against the effects of the elements.

CHAPTER XIX.

BABES IN CHICKLAND.

By WILLARD C. THOMPSON.

To the average American farmer, who is endowed with an absorbing love for his work, who believes that in it there is honor and that over which he may justly be proud, and who is interested in watching nature grow and develop, there is no more attractive labor than that which is created in the care of young animals and birds. A man has no right to be called a farmer if he cannot see interest in the young lambs that gambol about in the sunshine in the sheep yard, in the little white pigs that frolic in the straw, in the calves that awkwardly run around the confines of their pen, and in the little chicks that fly to the call of the mother hen, or watch for the feeder from the brooder runs. Young life has a magnetism that draws and commands attention. This magnetism compels interest. For this reason many farmers spend much of their time in the care of the young things on their farms. Close watch over the young brings a realization of why they need particular attention. They are all just starting to live. Their little bodies have not yet been built up to the point where they can withstand environmental conditions. Often times the right kind of care is not given them because the farmer does not understand just what to do, and in such cases a moment taken to consider the question is time well invested.

I started out to tell a true story of little chicks that happened to find themselves on a modern American farm. This farm is a general stock farm, where each Spring there are hundreds of young lives brought forth, some in the flocks of sheep, some in the herds of swine and cattle but far more in the poultry pens. The manager of the farm has been raising chicks for many years, and through those years he has been learning from real experience some of the difficulties that lay across the path of his "Babes in Chickland" on their way to maturity. Every man that is earning his livelihood on the farm, and a part of it, at least,

by raising poultry for meat and eggs, should read the story of the chicks on this farm with critical interest.

Last Spring these particular little chickens numbered something over four thousand. They were strong, vigorous, healthy Rhode Island Reds. When they were just beginning to liven up after a couple of days under the hovers they resembled tiny balls of buff, or yellowish, fur. Every chick was "up and coming," none stayed by themselves in a sleepy, sulky attitude. What was the great secret of the vitality of these chicks? All chicks are not that way. In too many flocks there is a large percentage of weak individuals that not only mar the beauty of the entire flock in every stage of their growth but ruin the profits of the season's effort. Strength is the result of breeding. The successful raising of chicks must begin back several generations before the chicks are hatched. Never can and never will mongrel stock produce young that are uniform and even in any characteristic. Never can and never will any kind of stock produce desirable offsprings if no attention is paid to the mating of the breeders. In this case the low percentage of poor chicks was due in large part, to the care with which the farmer has always selected the best birds in his flock for the breeding pen. He has saved eggs from his regular laying flock for almost ten years now, not since he learned his lesson. Every Winter he watches his laying flocks closely. He keeps his eye on the pullets that perform the biggest stunts in egg laying. When they are in their second Winter he goes into the pens and selects the best of them and removes them from the laying flock and places them in a special pen where they are mated with a splendid male.

He picks out the big, well-matured hens that have been laying a good number of eggs. He selects the hens that are uniform in size, that have the shape of body that is most desired in a typical Rhode Island Red, and that are of an even red color. He has learned that like does produce like and that if he wants good birds he must have good breeders. Birds such as he puts into these breeding pens have never suffered from disease and are in strong, vigorous health. This is his first precaution against trouble with the chicks in the first few days out of the shell. These breeding birds are housed in small pens, from ten to fifteen or twenty birds being kept together. A part of his breeding pens

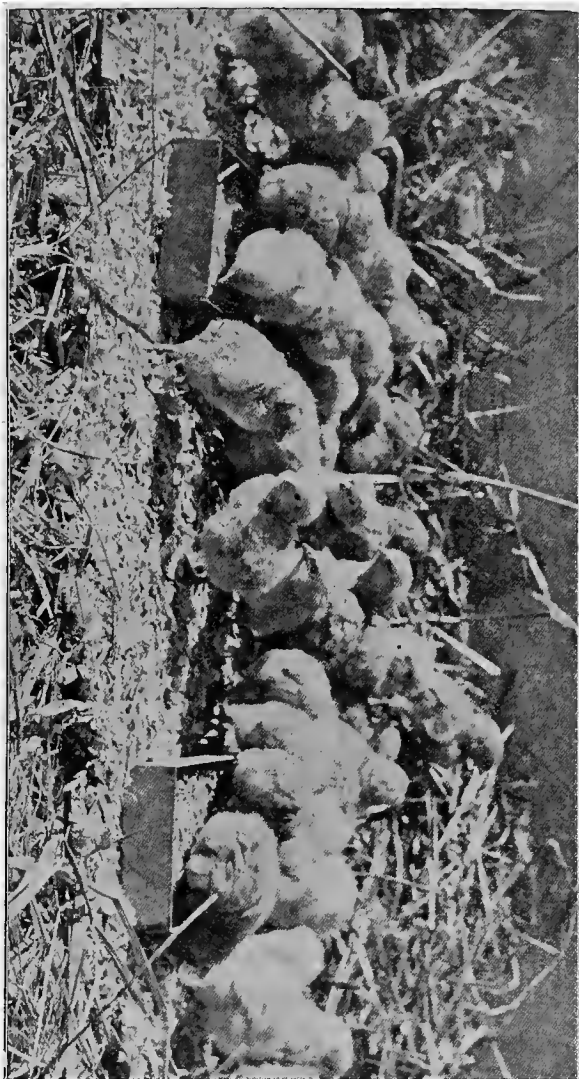
consist of special colony houses about six by eight feet in size, of the shed and open front type. The rest of the pens are divisions of what used to be a regular laying house. These breeders are not forced during the Winter for heavy production, but are allowed to store up energy for the eggs at the hatching season. This rest has insured a large percentage of fertile, strong eggs.

In the latter part of January and February the business of the season starts in dead earnest. On the very cold days when the mercury has fallen to zero and below the gathering of eggs from the breeding pens is very punctual. Two or three trips are made to the pens during the morning and two in the afternoon. A covered basket with a thick cloth in the bottom of it is used to carry the eggs into the house. This is to prevent the chilling or freezing of eggs that are to be placed in the incubators. Chilled eggs nearly always result in dead germs that never hatch or in weak chicks that do not add anything to the flock. When the eggs are in the house they are carefully spread out on tables or shelves in a room that has a temperature of about sixty-five degrees. In a room of this kind they are not subjected to a temperature low enough to chill them or high enough to start their development. They are turned each day in order to prevent the yolk from settling or sticking to one side of the shell. It is planned not to have to keep hatching eggs for more than two weeks after they are laid before they are placed in the incubator. The fresher the eggs the stronger the germs will be and the better and more vigorous will the chicks hatch out.

Another selection takes place when the incubators are running at constant temperature and ready for the eggs. Only the smooth, large eggs are placed in the machine. Double-yolked, mis-shapen, extra long, bullet shaped, or soft-shelled eggs are all culled out and used in the kitchen. When the trays are finally filled they contain only uniform eggs, alike in shape and size, and a light reddish brown in color. All this care and selection takes little time, and it is nothing more than the application of the finest form of common sense.

The artificial incubators have practically taken the place of the mother hen on this farm, mainly because so large a number of chicks are to be raised each year that hatching with mother hens would be a long and tedious effort. For the first few years

Forty little huskies, less than a week old, fighting with one another for a chance at the bran pans.



of his incubator experience the farmer ran the incubator in a living room in his house. The good looking incubator did not mar the appearance of the room, and was extremely handy for his wife to look after during the day when his attention was called to the barns. When he became persuaded that with a little care the poultry game was a winning one for him it was necessary to buy two or three other machines. He wanted to hatch his chicks in March, in order that they might become fully matured and ready to lay eggs when the next Winter set in. As long as he had but one machine he was forced to have a lot of chicks of different ages. Finally he fitted up a room in the cellar in which he now operates four standard makes of incubators. This room was dry and could be well ventilated, although it was not very light. He kept it at about sixty-five degrees during the time that the machines were in operation, and tried in every way to maintain uniform conditions in the room. One day he made the remark that in the chicken raising game uniformity was one of the most important items in every part; and he struck the nail on the head then as he usually has done.

It was a bitterly cold day along in the second week of March last Spring that over eight hundred of the bright downy little Reds were chirping and working their way toward the glass front of the incubator ready to be taken to the brooder. The front of the machine had been covered with a newspaper thus excluding the greater part of the light from the incubator chamber. As a result of this the chicks had slept for the first twelve hours out of the eggs, as nature intended that they should. They had dried and fluffed out perfectly, and were upon their feet, strong and vigorous. When the man was ready to move the chicks he brought another covered basket which was lined with a soft, woolen cloth that had been warmed. He then warmed his hands and opened the door of the machine. Each chick was very carefully picked up and placed in the basket. He was careful not to take too many at one trip. He had learned in earlier years that chilling the tiny little chick in the transfer from incubator to the brooder had meant the sealing of its death warrant.

The chicks were placed under the hover of the brooder in the long brooder house, as the coal-burning stoves were not used until a little later in the season when the next brood of chicks

were hatched. The lamps that furnished the heat for the separate brooders had been very carefully cleaned, furnished with new wicks, and gotten into perfect running order two days before the chicks were taken from the incubator. The lamp was carefully trimmed and filled each day in the same manner as the lamps of the incubator had been trimmed and filled. Constant temperature had been obtained for twelve hours prior to the coming of the chicks. All this attention was found necessary if chicks were to be brooded artificially with any degree of success. Temperature and feed are the two governing factors in the management of chicks in an artificial brooder. Continued high temperature killed several hundred chicks on this farm several years ago. Faulty lamps were responsible for a lack of even temperature and thus took a few hundred more. Those losses led him to adopt a system of brooder temperature management that has been most satisfactory. He used it last Spring with the eight hundred chicks referred to above and his loss was under eight per cent.

The first two days the temperature stood at one hundred degrees under the hover, and it gradually dropped until at the end of the first week it was running at ninety-eight. During the second week it gradually dropped two degrees and at the end of the third week it was running around ninety-two. During the fourth and fifth weeks the drop was made to about eighty-five. Then the chicks were "hardened" and were able to get along with little or no artificial heat. As they grew their bodies generated enough heat to keep them comfortable when they roosted together. Many brooder chicks get so much artificial heat that they are not toughened when they are put out on the range, and the result invariably is that they get colds and many of them die from exposure. The system of gradually getting them accustomed to lower temperature is practical and commendable.

The first food that these little Rhode Island Reds received was not given them until they had been in the brooder for twenty-four hours, making them something over forty-eight hours of age before they were fed for the first time. In his early experience with chicks he had lost many because he had not waited until they were at least two days old before feeding them. Nature has supplied enough food in the body of the chick in the

form of the yolk sac to last the chick for several days. If this is not used up it will decay and cause poisoning and consequent death. The first food was easily seen and attracted the eye of the chick. It was fine, chick-size. They needed this to take the place of the teeth that other animals have. Then they found a small basin of sour skim milk in the run just outside the hover. They walked up to this basin rather hesitatingly and gave one or two picks at the material. It tasted good, soon a number of them were trying the white food in each brooder pen, and there were about one hundred chicks in each run. The farmer had been careful not to over-crowd them. After a few hours they were fed fine rolled oats, which was an excellent feed. This was varied with finely chopped eggs that had been hard-boiled. The eggs were the infertiles that had been cuddled out of the incubator on the seventh day of incubation. Along with this food was pure water. It was always kept pure, and the pan was cleaned out frequently in order to insure absolute cleanliness. The chicks were given free access to sour skim milk and fresh water, for the farmer realized that these two things were of vital importance to the constant growth of his flock.

The general way in which he managed his chicks with regard to feed was simple and easy and practical and common sense. After the third day he started feeding a fine grain ration about five times a day. He did this in order to keep them always a little hungry. A small amount of feed often is much better than a large amount of feed fed at long intervals. This grain mixture was composed of:

Fine cracked corn, 20 pounds; fine cracked wheat, 25 pounds; pin head oats, 20 pounds; fine charcoal, three pounds; fine grit, three pounds.

This dry grain ration was supplemented with a small amount of hard boiled egg and sprouted oats. The latter was given as a source of succulent, juicy food. In one end of the brooder house there is a small closet in which there are racks on which the trays filled with oats are always kept sprouting. After the seventh day wheat bran was placed in small, clean hoppers. For the first few days the hopper was not left in the pen but for a few hours. At the third week a regular dry mash was placed in the hoppers instead of bran. It was made up of:

Poultry loves range, the more you can furnish the better the results. Where natural range is restricted provide artificial shade and supply plenty of green food.



Wheat bran, ten pounds; corn meal, five pounds; rolled oats, three pounds; meat scraps, one pound; bone meal, one pound.

This scheme of feeding together with the gradual decreasing of brooder temperatures, developed chicks that were uniform and strong and healthy.

After the sixth week the chicks were carefully sorted, the pullets being placed on a fine large range which was in a fruit orchard, and the cockerels were penned up and fed specially for broilers. The broilers at about nine weeks brought top market prices, and they were fine. The pullets were housed at night in colony houses and allowed the freedom of the whole orchard during the Summer days. In the Fall they were developed into splendid birds for the Winter laying pens.

The later lots of chicks fared much the same as did these eight hundred, except that some were brooded and the coal burning brooders. They turned out well but as yet that type of brooder is still an experiment on this particular farm. This Spring larger preparations than ever were made for the "Babes in Chickland." Probably the chicks this year will be better than ever for the breeding pens this Winter have been even finer than before. The chicks on every farm can be better than ever when all our farmers awaken to the realization of the importance of the little things that made for the success of the birds on "Chickland."



CHAPTER XX.

THE HOME PRESERVATION OF EGGS

By WILLARD C. THOMPSON.

During the cold days of the Winter months the egg problem is one of paramount importance to thousands of people. To the producer that part of the problem is of greatest interest which relates to ways and means of getting more eggs out of the birds in his flocks. To the consumer another phase of the egg problem asserts itself, namely that of getting eggs from the markets for a reasonable price, still at the same time getting good quality in the product. It is a season of the year when all odds are against a steady, liberal and constant supply. It is the unnatural period for egg production. The natural time of production is in the Spring. Cold weather, with its low temperatures, snows and winds, does not stimulate egg production. The poultryman finds that he needs to work particularly hard to surround his birds with suitable environment that they will turn his grains into marketable eggs. The consumer finds the supply of fresh eggs short during the cold months, and, in fact, many years, the supply of eggs of any kind is limited. The result of these natural factors, along with others, is that prices go soaring as Winter comes on. Not for many years, if ever, will the poultry producers be able to supply the demand for eggs during the Winter months, to the extent of preventing high prices to the consuming public. This annual rise in egg prices is almost an established economic fact. It is expected annually, fluctuating from year to year due to seasonal and other peculiar factors operating for that particular time. The cold storage has entered into the egg business as a very important factor, having especially great bearing upon the Winter egg problem. In many localities, particularly in rural districts, the eggs from cold storage houses, which are usually lower in price than fresh eggs, as would naturally be expected, are not available. In these same localities it becomes a very difficult matter to get eggs for table and cooking purposes. In many instances fresh eggs are sold at a prohibitive figure. Many hundreds of people cannot afford those luxuries, if

they can get eggs at cheaper rates. Many poultry keepers would like to sell all the eggs they can produce, if they could get eggs for home consumption from another source. The reason is obvious. It is safe to say that there is always a market for fresh eggs during the Winter time.

What, then, has all this got to do with the subject of the home preservation of eggs? Just this. It is possible to preserve eggs at a season of the year when eggs are plentiful and cheap in price for use at a later time. The cold storage concerns do this by packing hundreds of crates of eggs away in rooms in which the temperature is kept cold and uniform at all times. But, particularly, to those people who cannot get these storage eggs, should they want them, there is a way which can be made use of to store or preserve eggs in relatively limited quantities. This is what I mean by home preservation of eggs. Each family can put away the eggs which it is estimated will be needed for its uses during the Winter. It is simply a means of economy for the housewife. The advocacy of this home preservation of eggs will not detract from the business of Winter egg production. There will be an ever increasing demand for fresh eggs which cannot for years be met. In the meantime many people might increase the efficiency of their provision for the necessities of life by considering the matters mentioned below.

When?

During the Spring nature has planned for the birds to reproduce their kind. In the intensified machine, the egg producing hen of today, the capacity for using large amounts of grains and transforming them rapidly into eggs is greatly increased as the warmer days of Spring appear. The markets begin early in the Spring to receive daily increasing shipments of fresh eggs. The prices go down, as the supply increases. Along in April most flocks are producing heavily and the market is about at its lowest mark. It is during this month, at least in normal years, that the housewife should plan to either save eggs for home preservation or buy them for that purpose. During April the fresh eggs are cheap, good value for the money expended. During this same month the eggs are of good quality and will keep well. Therefore begin saving eggs or buying them as early in April as you can. Figure out approximately how many your family will need, at least for cooking



When corn stalks are cut up by the shredder they furnish an excellent litter for the poultry house.

purposes, during November and the following Winter months, and obtain that supply accordingly.

What Kind of Eggs?

Not any kind of an egg should be saved for home preservation. They are not all worth the effort. In the first place, one of the most important things to demand in eggs that are to be preserved at home, or elsewhere, for that matter, is that they be sterile. A sterile egg is an egg produced by a female in a pen in which there is no male bird, in other words sterile eggs are unfertilized eggs, eggs that will not grow to produce chicks. The best egg producers in the poultry business today never dream of putting male birds in their laying flocks, except during the breeding season in the Spring. But many poultry keepers do not breed from pullets, for they should not for best and continued good results, and therefore never have male birds in those flocks during the first year. Market eggs should always be sterile, unfertilized eggs, if they are to be of highest quality. The reason for this is obvious. A sterile egg will not start to grow and develop an embryo chick when heat is applied to it, as will be the case in fertile eggs. If eggs are marketed, eggs that are fertile, many blood rings, rots and bad eggs result. The greatest step in the improvement of the quality of market eggs during the last few years has been the driving home of the importance of producing sterile eggs for selling purposes upon poultry producers. Sterile eggs, when preserved at home, will tend to keep better than fertile eggs, particularly if they do not happen to always be stored in a cool place. Eggs that are to be preserved should be clean shelled, whole shelled, and of good size. If the eggs are slightly dirty or stained take a damp cloth and wipe them off, leaving them clean before packing them away. Dirt, or manure, on the shell of the eggs may contain putrefactive bacteria which will cause decay later on, or may give an undesirable taste to the eggs. It is safest and most sanitary to clean all eggs that are to be preserved. Do not store away any cracked eggs. Handle each one carefully as they are being selected, in order to throw out any that are not perfectly whole. A cracked egg may spoil an entire crock or jar of eggs that are preserved in one of the liquid preservatives, by contaminating the liquid creating a bad odor in the jar which may soon be taken up by the other eggs in that jar. A cracked egg will not remain good for any great length of time. Size is important in that everyone wants full measure. Of course,

small eggs will keep just as well as large ones. Brown shelled and white shelled eggs will both preserve alike. There is much said about differences in quality between eggs of different shell colors, but the fact remains that so far as their edible characteristics are concerned the two are practically identical. It is much a matter of prejudice either way.

Liquid Preservatives

Many people have heard of sodium silicate, or water glass, as it is so often called. When mixed with water this sodium silicate forms a liquid which sometimes is faintly gelatinous in nature. It is poured over the eggs, the theory of preservation being that it would keep the air away from the surfaces of the eggs, thus preventing the evaporation of the contents of the eggs. Any preservative must cut the evaporation of the inner contents of the shell down to a minimum, if it is to be successful. It must at the same time not impart undesirable qualities to the eggs. Water glass has been found by many hundreds of people to be quite satisfactory as a home preservative for eggs. An earthenware crock is a convenient and satisfactory container in which to preserve eggs by this method. Wash the crock, or jar out thoroughly before using, scalding it with boiling water previous to placing the eggs in it. Be sure that it is free from all bad odors or strong smells, for eggs will often absorb these, thus spoiling the quality of the preserved eggs. Then place the eggs which have previously been cleaned and selected in the jar, preferably with the small end down, great care being used to pack them in carefully. Then mix the sodium silicate with clean, boiled water in the proportions recommended by the manufacturer. There are a number of egg preservatives on the market that are similar to the sodium silicate. Allow the mixture to cool before pouring it over the eggs. Be sure that there are at least two inches of liquid over the top layer of eggs, to take care of evaporation from the surface of the liquid. Cover the jars and store in a cool place, such as the average cellar room will be. Examine the jars every five or six weeks, sometimes adding a bit of water, if necessary, to keep the two inches above the eggs. Be careful in moving these crocks or jars not to crack the eggs.

Another liquid preservative can be used, which is called the lime solution. Take a piece of fresh stone lime about the size of

a small lemon and place it in a gallon of clean, fresh water, preferably boiling water. Allow it several minutes in which to thoroughly slake, during which time the lime will be mixed well and finally allowed to settle to the solution. After it has cooled pour it over the eggs which have been prepared as for the sodium silicate method. The writer has very recently examined eggs which have been down for seven months in each of these liquid preservative solutions and has found them in good condition. Both methods offer a solution of the problem of home preservation. Some people may like one method better, and some another.

Annointment Preservatives

As against the liquid preservatives which have just been briefly discussed there are a few types of preservatives that have recently come to the attention of poultrymen. They are called annointment preservatives. The reason lies in that materials are annointed on the shells of the eggs which are to accomplish the same ends as the liquids above named, namely that they will prevent evaporation of the inside contents of the shell. Practically all of them are fundamentally oils or fats which can be applied to the shells of the eggs and which will not themselves evaporate or allow evaporation through a thin coating of them. The eggs are cleaned and sorted as for the other method of preservation, and all eggs are perfectly dry. Then a small amount of the preservative is placed in the palms of the hands and all eggs are covered with a thin coating of the preservative. Then the eggs may be stored away in a cool place in cartons, cases, or boxes of any convenient kind. One of the advantages claimed for preservatives of this type is that there is no liquid to handle, no crocks necessary, one cracked egg cannot affect others, and that eggs thus preserved can be turned from time to time during the season.

Other Methods

Many housewives have packed eggs away in oats, bran and other materials in years past with good results. The main thing to remember is to pack them away from the air and in a cool, clean place. It has not been the object of this discussion to mention all possible ways in which eggs may be preserved for home

use. Only a few methods that have been tried by the writer are mentioned.

No eggs should be held in any kind of storage or preservative for too long a period, if they are to be used for eating purposes. From five to eight months is usually as long as it is necessary to keep eggs which have been put down in any home preservative. By that time the new eggs from the following Spring will be plentiful. Never put down too many eggs. Most people prefer



Quiet place for a hen to build her nest.

to use preserved eggs for cooking and to buy fresh eggs for table usage. This is perhaps more a matter of taste or perhaps prejudice than anything else. A family can save money by preserving a few eggs each Spring. Try a few the first year, not risking too many until the method has been tried and its results have been investigated by you.

And in the meantime the egg producers should keep right on trying to ever better their methods of poultry keeping and management so as to get more and better eggs. There is room a plenty for many sides of the poultry business to develop.

CHAPTER XXI.

EFFICIENCY IN POULTRY KEEPING.

By JAMES T. HUSTON.

This is the day of efficiency and in all lines of endeavor, whether it be the laborer at his or her daily tasks, or the banker in the daily handling of the country's dollars, all must prove their worth or be lost in the daily grind of twentieth century progress.

In no other branch of business can efficiency count for more, or bring greater results than the handling of poultry, whether your flock consists of a few "fancy" ones on a back lot, or a ten thousand hen flock on a modern poultry farm, efficiency must be practiced and put into play if you desire to reap the profits which are due you.

True it is that many failures have been made in the poultry business, and failures will be made as long as this old world stands, but why the failures should be so magnified, and so little said of the successful men and women in the "chicken" business, has always been a mystery to the writer.

We believe that any man or woman, who has a fair knowledge of the care and attention required in raising poultry, can succeed in the business, this, of course depending on the ability of the person in being able to handle the proposition without the increased cost of hired labor.

The most successful poultry plants in existence are for the most part "one man" plants, and right here, let it be stated, is where efficiency counts.

Build on a foundation of careful arrangements, feel every inch of the way, and where others have failed, make these failures your most careful study. We believe that many of the failures in the business come from the fact that the beginner in starting his plant has as his goal the success attained by a large and successful

breeder. While it is right and proper that this goal should be strived for it is also well to remember that this large and successful breeder, at one time started as you have started, and only through his being able to grasp the details, day by day, and building his business on a system such as all successful ventures are founded on, that he has attained the goal to which you aspire.

Books are written by the score on poultry topics; some are of little value to the beginner, others are the cause of many failures, yet if judgment is used in the selection of the books you should read before entering in a large scale into poultry keeping, much help would be rendered you.

Books are an education, and the student of our best poultry books have the advantage of a course of instruction which for a small outlay will be of inestimable value and of great benefit in the building of a successful poultry plant.

We have visited poultry farms where all that was lacking was system to make them paying, yet the owners failed in every way to comprehend the reason of their apparent failure.

Eliminate waste, arrange your buildings for convenience in handling your stock, learn the secrets of successful feeding, utilize your room to the best advantage, and try.

Some time ago we visited a plant where the natural conditions were ideal, yet the owner of this plant had built his houses and laid out his runs in such a manner that his work was doubled. A nice little stream crossed this farm, but this poultry man was carrying water to his breeding pens, when the houses could have been so planned that the stream could have been utilized in avoiding the labor of supplying water most of the year, his reason being that the building looked better and showed to greater advantage from the road. We mention this to illustrate how often little things such as this make extra labor, aside from depriving the stock of one of nature's best helps.

It is not always the fine buildings and equipment which make the most profitable plants; in fact they are useless unless the owner knows the methods of successful poultry keeping and puts the right ideas into effect.

We have not attempted to touch on what breed you should take up, or which is the most profitable as exhibition, layers or market

fowls, this is a question which can be settled by yourself. If your conditions are right, your ideas and knowledge of mating up to the Standard, you have no fear of failure in this respect.

In this chapter we are only hoping that we may spur the beginner on to greater efficiency in the conducting of their business, realizing that economy must be practiced both in building their plant as well as the running of same. We do not wish, however, to be misunderstood in this respect and, in stating that economy should be practiced, we do not advise cheapness, as nowhere else is cheapness to be avoided than in cheap houses, feeds or cheap stock. Economy seldom means cheapness. Efficiency, if worked out, will soon determine the weak spots and it is up to the man or woman who is operating the plant to see that every move counts, that no useless steps are taken and that time-saving devices mean more saving to them.

Remember each day has its tasks and that every moment which you spend to advantage means greater profit to you.

Start slow, build on a carefully prepared plan, profiting by the mistakes of others and only following in the course of our successful breeders, where you are sure that your conditions are of such a nature that you have the same opportunity for success as they.

We believe the best asset the poultryman has is the natural love of the work. Whenever it becomes a drudge, better stop, as here is where success vanishes.

Keep careful account of every expenditure, produce with quality the first consideration. Make your reputation on clean and square dealings, and we believe that no other business will prove of greater profit, for the amount invested, than the poultry business.

CHAPTER XXII.

CONGENIAL WORK IS SUCCESSFUL WORK.

By JAMES T. HUSTON.

We are sometimes led into things we do not just like to do, in such instances the results accomplished rarely count for success, but where we enter whole-hearted into the task we are about to perform, the results usually are the reverse. Particularly, is this so where the keeping of poultry is concerned. Rarely do we find an instance where a man or woman has entered into the poultry business with a deep and lasting love for the work that success has not crowned their efforts.

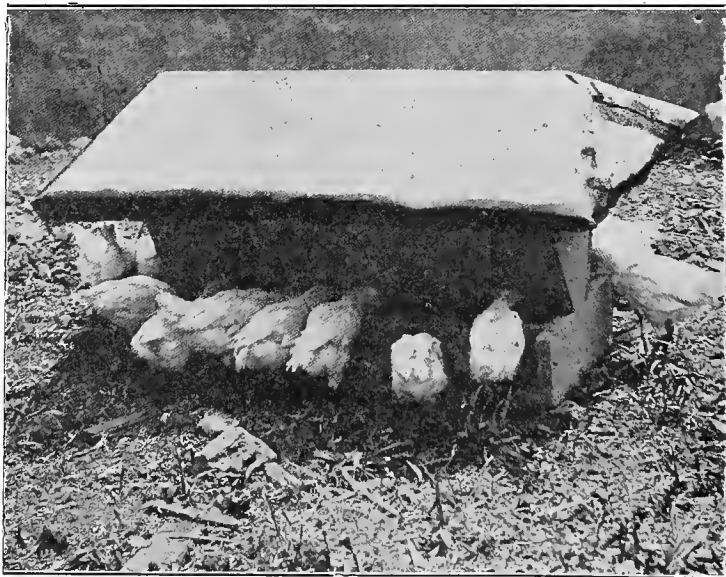
Perhaps no other form of live stock keeping is being more talked of today than poultry culture and well it should be. When we consider the tremendous demand for high grade poultry products, we wonder that years ago this question of more and better poultry was not more widely agitated.

In every city, town and hamlet, the demand for better poultry has become widespread, with the result that the consumer demands and insists that his eggs shall be of the best quality and that the fowl for consumption shall be of a superior grade. With this demand comes the question of supply, and here we note that the opportunities thus presented offer a wide field to the one who by experience is adapted to the work, success depending not only on ability, but on a deep rooted love of the work at hand.

It is not our intentions to enter in the successes, and failures as well, made by many in taking up poultry culture as a livelihood, but rather to impress those seeking opportunities that success is bound to follow those who make the start rightly.

"Start right" and you are likely to continue going right. "Start wrong" and failure grasps you before you have gone very far. The starting right can only be accomplished by the one who beforehand has made a careful study of just how to begin and this knowledge is best observed by experimenting with a small flock.

Some years ago a busy city man determined that a small flock of hens which came under his notice and were proving highly profitable to their owner that he too would enter the poultry business, deciding that if this small flock was so profitable, that a large flock would reap him big profits; accordingly he invested his surplus cash in a large ranch in a western state, in one year's time he discovered his mistake. Unlike many failures, this man had learned to love the work and, seeing his mistake, began over again, starting where he should have at the beginning with a small flock and growing with experience. Today this breeder has a model egg farm and, while not large, is bringing him a nice income. These are the real examples of success and failure and worked out systematically. We all were taught to creep before we walked, so let us use the same reasoning in our efforts towards success in the poultry business. The opportunities are here, but in so doing let every move be made with the object of a permanent success in view.



An out-door dry mash for the youngsters. See how they relish the delicious feed.

CHAPTER XXIII.

THE VALUE OF GRIT IN POULTRY FEEDING.

By M. A. JULL.

Grit in the bird's gizzard, according to a long accepted theory, performs a function similar to that of teeth in mammalia, Dr. T. P. Shaw (McGill University) who has recently made some close observations on the physiology of digestion in the domestic fowl, states: "The function of the gizzard is to crush the hard grains. This it accomplishes by muscular contraction which rubs the grains one against another. This process is very much facilitated if sharp particles of grit are mixed with the grain. Some writers claim that grit is unnecessary for poultry. We fail to notice the reports of any experiments which prove that fowls without grit, in the gizzard, when fed on whole grain, did as well as fowls with free access to grit. Some experiments have been reported where the observers have taken for granted that the gizzard did not contain grit because the birds had not access to any for a month. The author has counted between fifteen and twenty-five particles of grit, varying in size from that of a pin-head to that of a split-pea, after birds have been without grit for three months. In young chicks the soft food given may become impacted in the gizzard. This is prevented by allowing chicks access to sharp sand. The sharp sand particles stimulate the muscular action of the gizzard, which is sluggish when soft food is given."

Passing from the finding of a scientist to those of a practical poultryman, we read the following in "Principles and Practices of Poultry Culture," by John H. Robinson:

"Reasoning from analogies observed between birds and ruminants, and from the fact that small particles of stone, glass, earthenware, etc., were often found in the gizzards of fowls in course of preparation for the table it was long ago assumed that the gizzard itself was inadequate for its function, and that the bird swallowed these substances because they were required for

the mastication of its food I followed the common practice (of feeding grit) long after I was convinced in my own mind that the birds have no need of grit to grind their food, but finally abandoned it, and since about 1902 have given no grit to chickens." John H. Robinson, however, rears his chickens largely on free range, so not led to any serious impairment of that there is all likelihood of their obtaining an abundance of grit without it being given as a particular feed. The same poultryman further reports: "A pen of twenty-five extra large hens in my yards supplied with indigestible grit and oyster shell, consumed in eight months less than a pint of grit." Presuming the hens in question to have had an average amount of grit in the gizzard at the commencement of the experiment, the weight of this argument against the feeding of grit to chickens is counter-balanced by the findings of Dr. Shaw regarding the length of time grit is retained in the gizzard.

Some experiment stations, as well as individual investigators have taken up the work along this line. In a bulletin entitled "Experiments With Poultry," compiled from the twenty-sixth annual report of the New York Agricultural Experiment Station, the results obtained from experiments made with nineteen lots of chickens, ranging from one to three weeks of age, showed that "the mixing of sand in the food, both in a ration containing food and in one without resulted in better health for the chickens and more efficient use of the food."

The United States Department of Agriculture published in 1904, a bulletin entitled "Digestion Experiments With Poultry," in a section with the heading, "The Utilization of Sand by Poultry," we find the following "The consumption of sand is much greater on an oat than a corn diet. This is no doubt occasioned by the greater proportion of fibre in the oats." Experiments with individual chickens were also recorded. Grit was withheld from two chickens for a period of six months. Up to five months the lack of gravel "had apparently digestion, but after this the animals appeared gradually to become debilitated." In another individual grit was found to be retained in the gizzard "after a lapse of seven months."

It is evident from the foregoing, that work in connection with the feeding of grit of authenticity in the work heretofore under-

taken being largely due to the factor of the presence of an undeterminable amount of grit in the gizzards of the birds at the time of experimenting.

The work undertaken in this investigation was of such a nature as to attempt to determine, definitely, the actual value of grit in poultry feeding.

Synopsis

Day-old chicks were used in all tests in this experiment, thus obviating any danger of there being any grit in the gizzard at the commencement of the tests, the chicks were carried through until maturity was reached, unless death intervened, or for other reasons, the test was discontinued. Each test comprised two lots of chicks identical as regards breeding, method of incubation and age. One lot in each test was supplied with grit ad libitum, the other received none; otherwise, except where specifically stated to the contrary, each lot was fed identically. Each lot of chicks in each test was weighed daily for the first two weeks, after which weekly weighings were substituted. Accurate weights of all food fed were recorded. Observation notes regarding the condition of the chicks in general were taken from time to time, as occasion demanded. All cases of mortality were subjected to post-mortem examinations to determine the cause of death, if possible, and the condition of the digestive system.

Feeding and Management

In all, five tests were completed in determining the value of feeding grit to chicks and one test on the value of feeding grit for egg production, the birds in the latter test were taken from the lots in the chick tests, the grit-fed pen being made up of chicks which had been supplied with grit from the start and the gritless-fed pen being made up of chicks from which grit had been withheld from the start.

In each of the tests grit was fed to one lot and withheld from the other. The grit was fed in hoppers and small quantities were added to the moistened mash feeding from time to time.

The method of feeding the mashes and grains was that employed in general practice. The two lots in the first three tests were given a mixture of hard boiled egg (without the shell) and

bread crumbs in the proportion of 1.2 for the first four days. Oatmeal was given twice daily until the chicks were one month old. The following mash mixture was fed dry in hoppers and moistened twice daily:

Two parts by weight oatmeal feed, one part by weight bran, one part by weight corn meal, one part by weight middlings, twenty per cent. fish scraps.

Finely cracked wheat was fed after the chicks were a few days old. Finely cut alfalfa hay was fed twice daily and fresh water was kept constantly before the chicks.

The lots of chicks in tests four and five were fed grain only, consisting of cracked corn and whole wheat from which the finer particles had been sifted to prevent the chicks from receiving any soft food whatsoever.

Wood shavings formed the litter for all of the chick tests. The chicks were confined indoors throughout the entire test, being kept in the brooder house which has a cement floor.

Test No. six extended from October 12 1914 to February 1, 1915.

The two pens were each four feet wide by twelve feet long, and cement floored. Straw was used for litter.

The method of feeding was practically the same as had been employed in the latter part of the tests from which they had come. Dry mash (same composition as in test 1.15 per cent. fish scrap) was kept before the birds in hoppers at all times, and fed moistened twice daily. Grain consisting of equal parts of wheat and cracked corn, with a few oats was fed morning and evening. Green food was given once daily. Water which was given in shallow pans raised off the floor, was changed twice daily. Air slacked lime was fed to both lots in hoppers. The grit fed to Lot A was large size mica crystal grit.

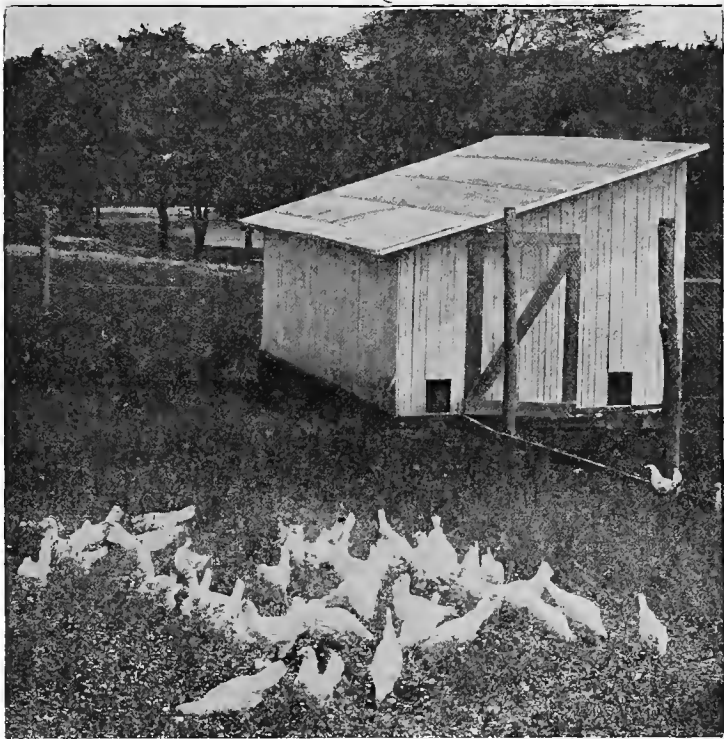
The birds were weighed at the beginning and ending of the test.

Summary of Results

Tests one and two gave no positive results from the fact that the chicks not receiving grit did almost as well as those which

received grit. There were no material differences in the gains in weight for the different lots and there was no material difference in mortality.

Chicks not supplied with grit seem to be able to digest finely



A fine house, get the idea, let one run grow up green while they enjoy the other. ground grains without any apparent injury to digestion and general health.

Test one showed that, where plenty of soft food as well as grain is fed, grit is by no means an indispensable requirement. From the standpoint of economy of food, however, there seems

to be a trifle in favor of grit feeding as may also be surmised from test six. The two lots in test two gave similarly with test one, practically parallel results from start to finish.

The tests which gave distinctly positive results, viz., Tests three, four and five, verified the findings of Dr. T. P. Shaw in regard to the digestion of hard grain, i. e., that it is much facilitated if sharp particles of grit are mixed with the grain. In all three tests this was shown definitely, both in the general condition of the chicks and in the gains made per unit of food consumed. Only one case of impaction of soft food in the gizzard, however, was observed. This was recorded in the post-mortem of chick No. four, lot B, test four.

No definite conclusions can be drawn from test six, although the observations from this single test are interesting. In this test lot A received grit while lot B did not receive grit.

The various tables show the following:

1. Lot B consumed $23\frac{1}{2}$ pounds more feed than Lot A.
2. Lot B consumed $54\frac{1}{2}$ pounds more mash than Lot A.
3. Lot A consumed 31 pounds more grain than Lot B.
4. Lot A gained in weight; a total of 99 oz. more than Lot B.
5. Lot B laid nearly twice as many eggs as Lot A.

It is seen from the foregoing that the chicks which received no grit consumed considerably more mash, to be exact, one-fifth more than did those to which grit had been fed. The greater total amount of food consumed by the chickens in Lot B can probably be accounted for by the greater number of eggs laid by them. This, however, is offset, to greater or less extent, by the superior proportionate gains in weight made by the chicks in Lot A.

That the absence of grit has at any rate no diminishing effect on egg production is very evident from item five. It must be noted in this connection, however, that at about the time occasional soft shelled eggs were laid in Lot B, the pullets responsible for the eggs became so weak twenty-four hours prior to laying that they could not even stand up. After laying, this weakness generally wears off gradually, during the succeeding days, until the pullets, were just about ready to lay again, when the

same weakness would again strike them. This condition continued with the pullets in Lot B to the end of the test. Further tests, however, would be necessary to determine definitely to what extent this weakness was due to the absence of grit.

All of the eggs laid by both lots were small in size. The majority of those laid by Lot B were thin shelled, while a few were soft shelled.

The exceedingly low egg production, as regards both lots, is to be attributed to the close confinement of which the birds have been subjected through their lives.

During the carrying out of these tests the question was raised as to the relation of grit to the absorption of the yolk sac. Careful perusal of the post-mortems in all the tests show that no definite indications were offered in support of any relation whatsoever.

Final deductions, therefore point to the practical necessity of grit for the economical digestion of whole grain. They tend also to bear out the contention of the findings of the New York Agricultural Experiment Station in regard to the more efficient use of the food when grit is fed. The advisability or otherwise, of the practical poultrymen going to the expense of providing commercial grit for the consumption of the fowls, resolved itself into a question of conditions. If the chicks are reared and kept largely under free range conditions on sandy soil, the value of any special provision of grit would be of a highly questionable nature. Where the chickens are subjected to considerable confinement, as on average intensive plants, the results of this work indicate that a provision of grit will prove profitable, if not indispensable.



CHAPTER XXIV.

FEEDING THE BROODER CHICKS.

By PROF. H. R. LEWIS.

Now is the season when the incubators are hatching and when all poultry keepers are concerned with the proper care and feeding of the newly hatched youngsters. It is safe to say that successful and permanent poultry farming depends primarily upon the ability of the poultryman to hatch and successfully rear to maturity a goodly number of birds each year, enough at least, to maintain his laying and breeding flocks up to their standard number and with no deterioration in vigor or stamina.

Abnormal losses in the brooder can be traced, in most instances, to either improper temperature or to a faulty feeding practice. The former can, with care and attention to directions be avoided. Proper feeding of young chicks, however, requires, first a sound knowledge of the nature of the chick's growth and fundamental principles of nutrition and secondly, it requires the working out of a simple, yet efficient feeding practice based on these principles. It is with these two phases of the problem that I shall especially deal.

Principles of Feeding Brooder Chicks

The feeder must, first of all, bear in mind that the chick is a very fast grower, in fact, there is no young animal which makes the rapid gain in weight for the first two weeks which the chick makes. This requires special care and attention as this rapid growth necessitates an abundance of easily digestible and nutritious food material. Special precaution must also be taken to keep the digestive system in proper working order. The following considerations should be given special attention.

Practice Retarded Early Feeding

The little chicks should not be fed concentrated feeds too soon. Just prior to hatching time the remaining portion of the yolk is drawn into the body. This yolk material supplies the require-

ments of the chick for feed for the first forty-eight or fifty hours. Heavy feeding prior to the time that this yolk material becomes well absorbed is very apt to be followed by bowel trouble and digestive disorders which result in a considerable mortality. The feeding of concentrated feeds before the second day in the brooder should be discouraged. The first food should be readily seen and nutritious. The artificially hatched chick has no mother to tell him what is best to eat and to take him out in search of feed, hence the poultryman must overcome this lack by providing the youngster with a first feed which he can readily see by its being light in color and conspicuous. This feed must be readily digestible and nutritious to meet the heavy demand for nutriment. Pin-head oats, oat meal and ground wheat make a good first feed.

Grit Is Very Important

Feed plenty of grit and shell from the very first day. The fine sharp grit is needed to fill the gizzard and get the digestive organs in condition to function properly. Fine shell answers the same purpose and also provides some lime, much of which is needed at this time. The first feed in the brooder should be large quantities of grit and shell.

Clean, Pure Water Is Essential

A constant supply of clean, fresh water should be kept before the flock. It should be placed in a fountain which cannot readily become contaminated and filled with litter and dirt. The fountain should be of a type which will keep the chicks from getting wet and dirty.

During the first three weeks, at least, a dry system of feeding is preferable to a wet system. Wet feeding requires special skill and, if care is not used, is very apt to get the digestive organs out of order, furthermore a greater amount of labor is required. The feeding receptacles may become dirty and sour which is conducive to disease and mortality. Dry feeding admits of a satisfactory growth and much less danger from sickness.

Wheat Bran a Valuable Chick Feed

Wheat bran is a valuable adjunct to the chick ration. It is especially palatable and rich in protein. It has a high ash con-

tent (phosphoric acid) and is fairly bulky which makes it useful to mix with finer and more concentrated feeds. Wheat bran aids digestion through the presence of a ferment "diatase" which it contains, it is mildly laxative and can be readily obtained at moderate prices.

Provide Plenty of Ash for Bone

The chick during its early growth makes bone rapidly, for this reason plenty of ash must be provided. Extensive experiments conducted at the New Jersey Experiment Station and published in bulletin 265 of that station, show the great value of bone in the ration. Dry granulated bone contains about 25 per cent. of phosphoric acid and about the same amount of protein and can be secured by the one hundred pounds. There is probably no one better feed for young chicks than dry ground bone.

Some Meat Is Essential

The same series of experiments showed conclusively the great need of animal material in the ration for growing chicks. Flocks fed moderate quantities of meat scrap made by far the greatest and fastest gains and were much healthier than flocks from which all animal material was withheld. The food nutrients from animal sources seem in practice to be more readily available than the same nutrients from vegetable sources. Large quantities of meat or concentrated animal protein feeds should not be fed, especially early in the brooding period, as the forcing which results is apt to cause a relatively high mortality.

Plenty of green feed in the form of lettuce, leaves, sprouted oat tops, green clover or alfalfa must be supplied. Such material is termed succulence, carrying as it does a high water content. It adds to the palatability of the ration, making it more digestible and keeping the chicks hungry and healthy.

Feed Little and Frequently

Owing to the small size of the digestive organs and the rapid growth which is made, it is very desirable to feed small amounts at a time, but to feed often. During the first three weeks it is the best practice to feed at least five times a day and to feed each time as much as is cleaned up between each feeding. Do not allow feed to remain from one feeding to another. Such a practice not only allows the feed to become old and mouldy and

hence dangerous but it also spoils the chick's appetite. Do not fail to have the floor of the brooder covered with fine chaff, preferably alfalfa or clover leaves and in this feed the grain ration. Exercise is the greatest preventative and remedy for poultry ills which has ever been discovered. Lastly, insure a clean feeding practice. Keep the hover clean and free from excessive quantities of droppings. Keep the floor of the hover and brooder covered with clean sweet litter, which must be dry at all times. Keep all drinking and feeding utensils clean. Cleanliness is the first requisite to any system of feeding.

A Practical Method of Feeding Brooder Chicks

There is doubtless no such thing as a one best ration for all conditions and under all circumstances. The following feeding practice is one which has been worked out at the New Jersey Experiment Station after many years of observation and trial. It is a ration which is in quite general use on poultry farms in that state with success. Its leading advantages are its simplicity, the ease of feeding, and the excellent results both as to low mortality and good growing resulting from its use. Where a large number of chicks are to be fed these special rations recommended can be profitably mixed at home, on the other hand where only a small number of chicks are to be cared for it will probably be the most economical for the poultryman to substitute in this general system of feeding some standard chick grain and mash.

The Feeding Practice

First day in the brooder: Plenty of grit and shell on the brooder floor, with fresh water and sour skim milk before them all the time.

The second day: Pin-head oats or oatmeal, three feedings, feeding only what will be cleaned up.

The next five days: Feed the following cracked grain ration five times daily on the brooder floor, giving only what the chicks will clean up between feedings.

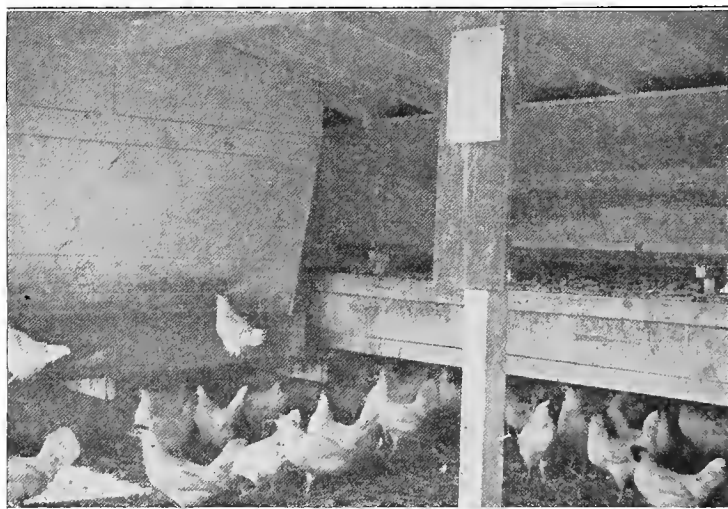
Scratch Ration—Fine cracked corn, 40 pounds; fine cracked wheat, 40 pounds; oat meal, 20 pounds; total, 100 pounds.

This ration may be supplemented by hard boiled eggs once a day and sprouted oat tops or other green feed twice a day in small amounts.

The seventh to the fourteenth day: Keep wheat bran in small hoppers before the chicks all of the time and feed the above cracker grain ration four times daily.

The third to the eighth week: Keep the following dry mash before the chicks all of the time in hoppers and feed the above grain ration three times daily.

Dry Chick Mash—Wheat bran, fifty pounds; gluten feed, ten pounds; corn meal, ten pounds; ground oats, ten pounds; meat



It is important that your poultry house is light and roomy, better keep a few less in a limited space than to crowd them. Light, good ventilation, roominess, are a part of comfort. These laying hens look as though they enjoyed these comforts.

scrap, ten pounds; dry granulated bone, ten pounds; total, 100 pounds.

After the chicks get to be five weeks old it will be more economical to use whole wheat and ordinary cracked corn in the grain ration and eliminate the fine cracked grains.

Outdoor runs should be provided adjacent to the brooders and they should be kept covered with a green crop of alfalfa, clover or other succulent growth. The chicks should be let out on this range as much of the time as weather permits.

The Great Value of Skim Milk

I wish here to call special attention to the value of sour skim milk in baby chick feeding. Sour milk is very palatable, it also contains much food value in its casein which is a form of protein or nitrogen. The greatest benefit however lies in its disinfecting qualities. The lactic acid present kills and prevents the multiplication of intestinal bacteria. White diarrhoea is one of the most dangerous of these forms. In order to get the greatest benefit from sour skim milk it should be given the youngsters to drink from the very first day, being given in a closed vacuum fountain so that the chicks cannot get their feathers soiled with it. It should be changed daily and the vessel kept perfectly clean. Experiments conducted at the Connecticut Experiment Station have proven its great value. Experiments conducted at the New Jersey Station as described on page 219 of the annual report for 1913, show that where sour skim milk is used as mentioned the percentage of mortality was very materially reduced over pens that did not receive it. Also the skim milk chicks made a gain in weight of over 28 per cent. more than those receiving no milk. Since these conclusive tests it is needless to say that we are feeding skim milk (sour) to all of our young chicks during the brooding period with the greatest success.

The Four Essentials

1. An understanding of the principles governing the growth and nutrition of chicks.
2. The working out of a simple, inexpensive but efficient ration.
3. The liberal feeding of sour milk to the youngsters for at least the first five weeks and longer if possible.
4. Watch the chicks carefully and remember that even the smallest detail is too important to be overlooked or neglected.

CHAPTER XXV.

STANDARD-BRED POULTRY FOR THE BEGINNER.

By CHAS. D. CLEVELAND.

I have endeavored to show that the significance of the word "standard-bred" is just as great in the poultry world as it could possibly be to the breeder of either thoroughbred horses, cattle, or any other form of livestock. For the establishment of the various races of standard-bred poultry I tried to give credit where credit was due, viz., to the fanciers of the world who made possible all the beautiful forms and all the varieties of color which we see today.

Perhaps some beginner has read my previous articles and the question which at once suggested itself to his mind was "Isn't this a pretty big field for me; how can I expect to at once jump into the shoes which fit some of these big breeders; wouldn't it be better for me to start with a few mongrels and learn something about breeding before I undertake anything along the line of fancy or standard-bred fowl?"

During the course of my experience which has now extended for twenty-five years I have oftentimes listened to conversations where almost the exact words used above were employed and in almost every case I have stopped to interrupt the conversation and to preach "standard-bredness," and my reason for invariably trying to put a check on this sort of talk was because I knew that if any of these beginners in the poultry world should start with stock which was not standard-bred that disappointment would follow inevitably. I knew that where a start was made without a definite purpose in view and a fixed object in mind failure along all lines is sure, and my liking and fascination for the poultry business and the art of breeding is such that I hate to see a disappointed or a misdirected effort along poultry lines.

I suppose there must always be two general classes of persons who start with poultry. There are those who have no natural love for livestock or interest in its development or progress;

those who care little or nothing about shape, size or color; those who just as soon take up one variety as another and these are the ones who think they will go into poultry because they have heard there is money in it and they take it up purely on this basis; that is to see how much they can make out of it from a purely commercial standpoint. With this class of beginners I have no sympathy and in them I take no interest. They will not last long in any event, and, therefore, there is little use in attempting to give them any advice for they have made up their minds and in most cases they know more at the beginning than they do at the end of their short poultry career.

The other class of beginners is composed of earnest men and women who love livestock for itself. Those who have had a natural liking for chickens since they were boys and girls; those who love beauty of form and beauty of color; those who have an ideal and want to strive until they produce it; those who realize that good blood means something and those to whom mongrels are a nightmare and ill-bred and ill-looking fowls an eyesore. Now, it is quite evident that with this latter class of poultry beginners all that is needed for a good start is a little encouragement—a fair dealing from the men who supply them with their original stock. This is the class of persons where a few failures, some disappointments and a little hard work cannot discourage. These are the persons who are destined to become successful—nothing can keep them down.

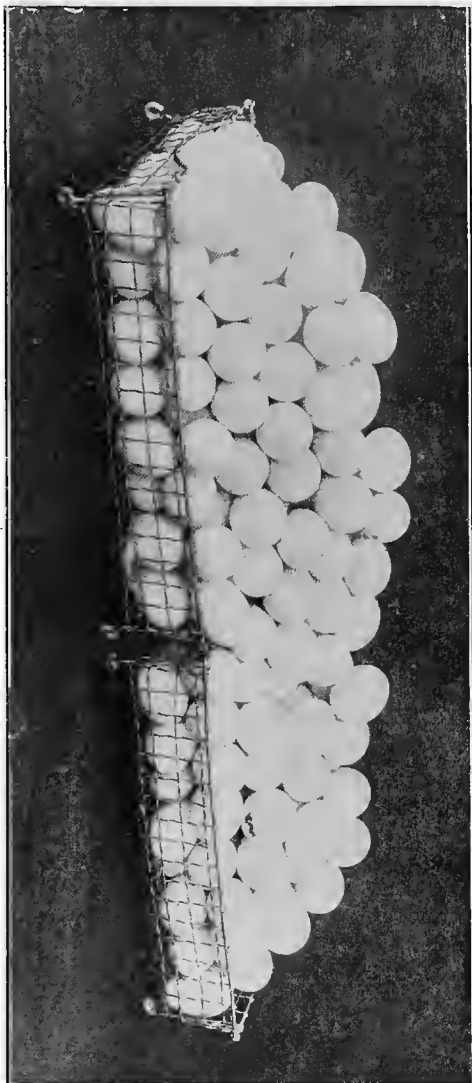
And the first drop of comfort and encouragement which I can offer to these real breeders in their beginnings is the thought that all the successful poultry men and women in the country were once beginners themselves. As it is in all branches of livestock breeding and in any business it will be found that experience is a great teacher, and this class of beginners is not to be put off or hindered in its start by the thought that success is not to be achieved in a moment. All must begin sometime. All those who have gone before have had their ups and downs and have come through the battle with a few scars, but serviceably sound in wind and limb.

So any beginners of the right sort may also be encouraged by the thought that in selecting standard-bred stock he is exercising sound business judgment. Any one can tell him and experience

will show him that there is no use wasting any time with birds that not only are inferior but are not pure-bred, for what can he expect to get out of it? For a year it is possible they may reproduce themselves but after that there will be a chaos of all sorts and conditions of ill-looking, ill-producing crosses which nobody would want to have around the place. Mongrels reproduce themselves; that is they beget mongrels and they keep on doing so forever. Mongrels do not hold out any promise of future betterment. No strain or family of mongrels is worth anything. All that their offspring is good for is to sell by the pound and it is not nearly as good for meat as if it were pure-bred. Thus the beginner who wishes to get results wants to improve; wants to have good looking chickens around the house; wants to be able to sell them for something; wants to have them lay a good quantity of good-sized eggs; wants good table fowl; wants to have the shape of the parents re-produced in the shape of the offspring and wants the color markings to remain; is wise and correct in his selection of standard-bred poultry for by this selection alone can he hope to achieve the results he desires.

Another drop of comfort which the beginner will be pleased with is the fact that no one yet has succeeded in producing any strain of standard-bred fowl that has been bred to a state of perfection such as would cause him to say "I have bred these birds so near to the standard; so perfect in all respects; so wonderful in every way that there is nothing left for me to do." In other words no matter what variety of fowl is selected by the beginner there is always room for improvement. Painstaking effort on his part may and very likely will result in improved form and color in whatever variety he may choose, and yet it is a safe proposition to say that when he is too old to breed poultry any longer he will be unable to say that there is not a chance for someone else to take up his work and carry it to a still higher degree of perfection.

Another point that the beginner should always bear in mind is that much of the arduous and difficult labor with standard-bred fowls has already been suffered and gone through by his predecessors. Unless the beginner should attempt to create a new variety he will find that almost all of the present forms of standard-bred fowls have already been bred to a comparatively high



BASKETS OF EGGS.

Uniformity in color, shape, size and weight, freshness, cleanliness, evenness and sterility are quality marks in table eggs. Of all the important characteristics that go to make up high quality in market eggs there is none of greater importance than the freshness of the article. Eggs more, perhaps, than many other common farm products, must be fresh if they are to be acceptable for table use.

degree of perfection and he only has to begin where the others have left off—he doesn't have to fight the whole battle but comes in like reinforcements at the critical and proper time.

One of the very worst things, therefore, that a beginner could possibly do would be to start with really poor stock; stock that is not absolutely standard-bred and pure, for the disappointments, failures and disasters that will overtake him should he do otherwise are almost sure to discourage the bravest and more ardent tyro. Nothing can come out of poor stock but poor stock, and as has already been pointed out the results can spell nothing but failure.

Therefore, it is the plain duty of every honest breeder to urge and advise the beginner to start with the very best standard-bred poultry he can afford to buy. The smallest number of the best specimens is the ideal beginning. Numbers can easily be secured in a comparatively short time. Quality is what is really desired and what every decent breeder is striving for. Quality can only be secured through standard-bred, pure-bred stock, coming from a well-known breeder of reputation and integrity and used with judgment and skill. Let the beginner, therefore, beware and not be led along the road of sorrow and despair, but follow the path indicated by the better judgment of the better class of poultrymen. The path of standard-bred poultry and ultimate success.



CHAPTER XXVI.

MAINTAINING A HEALTHY POULTRY FLOCK.

By H. R. LEWIS.

Profit is the ultimate goal of every poultryman whether he be suburbanite, farmer or commercial poultry keeper. Combined with the money returns the suburban flock is cared for in many cases for the pleasure which is derived and with the idea that a practical knowledge of poultry management can be secured which can later be put to practical test on a larger scale when the parties interested are able to become established on a farm of their own. To the farmer his flock supplies his home table with delicacies which would cost much to purchase and to the large flock man his birds are kept purely as a business proposition and their value is determined by the dollars and cents which they will return to him as profit. The analogy between cleanliness and profit must be appreciated and the former maintained if the latter is to be secured.

You ask how it is possible to put this principle into practical use? Fortunately the answer is simple. It is by putting into every day use the simple principles of sanitation. This means that the profit will only come from a flock which is housed in a well ventilated, dry, warm shelter which is kept sweet and clean; this shelter in turn being placed on a high, dry, well drained slope and the surrounding area kept covered with green vegetation; and lastly the fowls which are placed in such an environment must be kept free from any traces of body parasites, either external or internal, and by watchfulness and precautions must be kept free from disease. The clean birds, in the clean house on the clean range means clean eggs and plenty of them.

Put a Cover Crop in the Poultry Yard

Do not let the poultry runs go through the Winter without a green crop growing in them. Such a crop cleanses the ranges

which are used during Spring and Summer. It also uses the filth as a fertilizer with which to grow a crop on which the birds can range and get much needed feed in the Spring. Give the top soil a coat of lime, about one ton to the acre, plow it under and harrow fine, after which seed with Winter wheat or rye and crimson clover in the proportion of one bushel of the grain to ten pounds of clover to the acre. Keep the birds off until a stand of about four inches is assured and then they can be allowed to graze upon it occasionally but not enough to eat it entirely off. Do not allow pools of stagnant water to lie about the yard, such places breed disease and uncleanness. Keep all feathers and other rubbish raked up and never allow any carcasses of dead birds to lay around. They should be burned or buried deep. To insure clean yards give the flocks all the range possible. The farm is the ideal place for poultry for they have an unlimited run and all of the advantages which go with this range.

Keep That Poultry House Clean

By keeping the poultry house clean and thus insuring a healthy environment the profit from the laying flock can be materially increased. There are four steps to be taken to insure such a clean house. The first operation should be the regular and complete removal of the droppings. The dropping boards are provided to hold and make easy of removal the voidings given off by the flock. If they are allowed to accumulate an unhealthy condition exists, moreover their frequent removal means no increased labor as it can be done so much more quickly. A wide hoe, a light weight, square edged basket and a pail of gypsum or land plaster is all that is required to keep the perches and dropping boards clean. The land plaster, if sprinkled on the boards after cleaning, acts as a deodorant and absorbent of liquids. Next in line after cleaning droppings is to insure that the litter be kept in proper condition. It should be deep, (about eight inches) coarse, dry and clean. Straw, shavings, dried leaves or a cheap grade of hay will answer, the first named being the best. The old litter should be replaced whenever it becomes finely ground and fails to hide the grain and thus compel exercise. Whenever it gets wet, due to the rain beating it, it should be replaced with dry material, thus preventing a common cause for colds and roup. A little labor and money spent in keeping the litter in

good condition is the best kind of insurance against disease. A good plan is to start the flock in the Fall with litter about four inches thick and then each week a small quantity of new material can be added keeping some coarse fresh material on top at all times, and a depth of at least six feet to eight inches.

A clean house is not complete without clean utensils, such as drinking fountains, hoppers and feeding troughs. Many epidemics of contagious diseases among the fowls is carried through the medium of the drinking vessel and the water which it contains. The water is warm and furnishes an ideal medium for bacteria to develop once they get access to same. Rinsing carefully each day and scalding each week will prevent such trouble. It wet mashers are fed, the feeding trough must be kept clean for nothing will disturb the digestive system of a bird quicker than sour moldy feed. Special care must be used with vessels in which skim milk is fed in order that they will not become contaminated due to lack of attention to cleaning. A clean feeding practice necessitates clean feeding utensils.

Don't forget that general cleaning of the entire house. The housekeeper who failed to make the regular Spring and Fall cleaning would be considered careless and slovenly, which terms apply equally well to the poultryman who fails to look after the health of his birds. Such a cleaning should be done in September and March, and oftener if conditions seem to warrant. It should include removing all fixtures and appliances and after cleaning putting them out in the sun to dry. All litter and other rubbish should be removed and the interior swept dry clean after which a good spraying with a disinfecting solution will complete the work of destroying the profit stealing bacteria. A most excellent solution to use can be mixed by taking five quarts of rock lime which should be slaked with hot water to about the consistency of cream, to this add a pint of zenoleum and a quart of kerosene. The entire mixture should be agitated thoroughly and diluted by adding twice as much water as the original volume or about fifteen quarts. This mixture can be put on with a spray pump in such a way that it will reach every part of the house and aside from cleaning the interior will give it a white, clean, cheery appearance. After spraying, the fixtures should be replaced, the floor covered with new litter and the nests filled with clean shav-

ings. Keep the muslin curtains free from excessive dust and keep the glass windows wiped clean to let in God's own pure sunshine which will do more than all else to spell cleanliness.

Be Sure Your Birds Are Clean

Clean birds means freedom from parasites, both external and internal. It means the prompt removal of any sick birds and the burning of all dead ones. Serious attacks of the most dreaded diseases can be only checked when taken in time and hence success means keeping a sharp lookout for any condition which looks abnormal. Canker is a serious infection when once established but if one or two birds are affected an immediate isolation and preventative measures will check the spread. Body life can be prevented from becoming so numerous as to be a serious handicap by providing a suitable dusting box in which is placed a mixture of equal parts of fine road dust, sifted coal ashes and air slaked lime. Tobacco dust added to this is most excellent. The red mites which feed on the fowls at night can be entirely eliminated by keeping the perching quarters saturated with crude petroleum or kerosene. These little beggars will cause great harm to a producing flock by sucking blood during the night and so lowering the vitality of the host that not only will production be greatly checked but those so attacked will be open to disease infection, their normal power of resistance being lowered.

The clean, sweet yard, covered with a luxuriant green crop, the well built, clean poultry house which is filled with well grown pullets which are kept clean and healthy due to a systematic scheme for proper sanitation cannot but spell profit in large letters to their keeper. And the largeness of the spelling will be determined by the completeness of the cleanliness.



